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JOURNAL OF FORESTRY

A professional journal devoted to all branches of forestry

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OUR ANNUAL MEETING

Do foresters take seriously their annual meeting? Judged by the number attending the last meeting of the Society at Madison, December 16 and 17, the answer must be negative. Judging by the interest taken in the discussion it was a decided success. Most of those present openly confessed that they would not have missed the meeting for anything, that they got new inspiration and new faith. After all, no program committee or mere numbers to make a worth while meeting. It is the spirit which is put into it by those who are present which spells its success or failure.

What contributed to the success of the meeting, in the opinion of the Editor, was not the technical papers read and discussed. They did not strike any new chord; they did not announce startling discoveries. The opponents battled over ground which was strewn on former occasions with broken lances and dented shields.

What is a technical forester? What is the place of forest utilization in forestry? Education of private owners versus regulation! The menace of grazing to timber growing! Old stuff! Yet still very much alive and worth while. What, however, really gave tone to the meeting was the growing self-consciousness of the Society as a professional organization. The future of the Society, its mission in social-economic life, its obligation to the people, and its duty to itself were the points of greatest interest. Thanks to the work of the Executive Council which gave two days before the meeting to a discussion of Society affairs and stimulated by its new vision of a greater and more useful Society, there came a gradual realization among those present that the Society is decidedly worth while. That it is coming to mean more and more to each individual member and there is some work to perform for every one of us.

This new tone that manifested itself at the annual meeting may not have yet reached the distant corners of our country where our membership is scattered. But those who were at the meeting are now missionaries who will carry the new faith back home. This, let us hope, may result eventually in a more solidified Society, a more unified aim, and a vim and desire to make the Society count in our own affairs and in the affairs of our country.

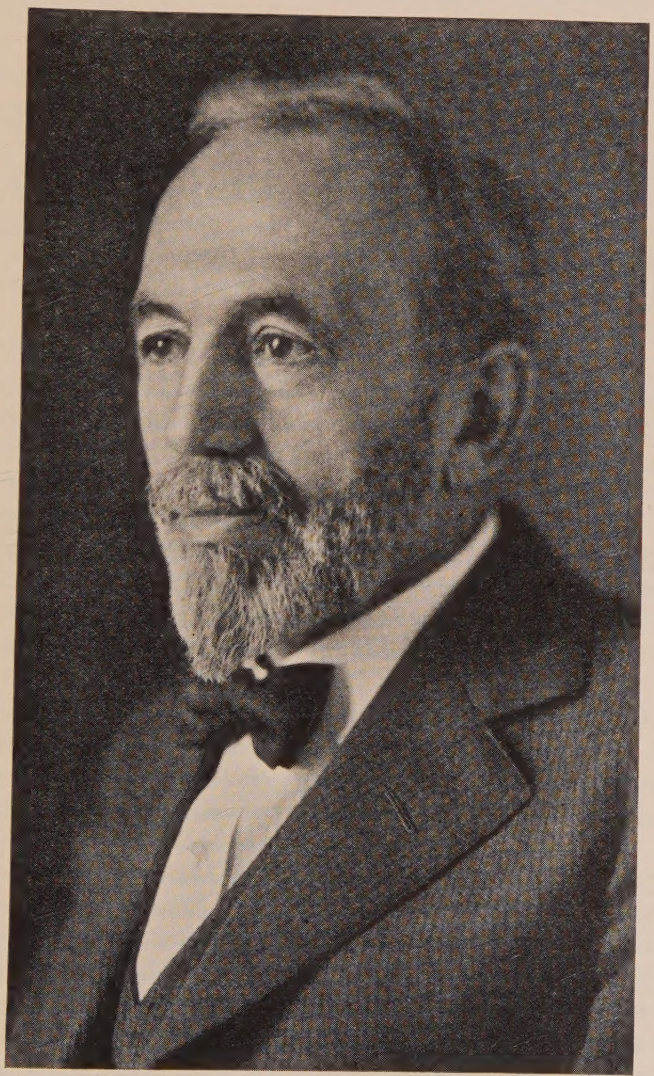
FILIBERT ROTH*
1858 — 1925

The Society of American Foresters mourns the loss of Filibert Roth, one of its most honored and beloved Fellows. His death removes from the family of foresters one of its pioneers who broke the trail and blazed the way for succeeding generations.

He knew the woods from long and close contact with them from his youth; and later, when he became a teacher of and a leader in forestry, this early experience gave a realism and deep conviction that could only have come from an intimate, personal knowledge of the forest. He was a born teacher possessed of a wonderful imagination, unexcelled ability for conveying ideas by word pictures, and a sympathetic understanding of the men who lived and worked in the woods. He swayed and influenced his students as no other teacher has yet done. His love for them deservedly earned for him the name of "Daddy Roth." His idealism, his unfailing faith in the future of forestry, even in the dark hours, will live in the hearts of his students throughout their lives, and will serve as a constant source of inspiration and courage.

Only what was mortal of Filibert Roth died; his spirit will live forever and be a beacon of hope, courage, and faith to foresters.

* Resolution adopted by the Society of American Foresters at its annual meeting at Madison, December 16, 1925.



FILIBERT ROTH
1858 — 1925

OUR SOCIETY'S AIMS*

By Samuel T. Dana

President, Society of American Foresters

A year ago President Mulford voiced in ringing terms the challenge of the next quarter century to foresters as individuals. Today I wish to consider our aims with you less as individuals than as members of a professional organization. We are facing a period of increased need and increased opportunity for the practice of forestry. What part shall the Society of American Foresters take in meeting that need and that opportunity?

First, let us get clearly in mind just what we mean by a profession and a professional organization. "A profession," says R. H. Tawney[1], "may be defined most simply as a trade which is organized, incompletely, no doubt, but genuinely for the performance of function. It is not simply a collection of individuals who get a living for themselves by the same kind of work. Nor is it merely a group which is organized exclusively for the economic protection of its members, although that is normally among its purposes. It is a body of men who carry on their work in accordance with rules designed to enforce certain standards, both for the better protection of its members and for the better service of the public . . . . Its essence is that it assumes certain responsibilities for the competence of its members or the quality of its wares, and that it deliberately prohibits certain kinds of conduct on the ground that, though they may be profitable to the individual, they are calculated to bring into disrepute the organization to which he belongs . . . though men enter it for a livelihood the measure of their success is the service which they perform, not the gains which they amass. They may, as in the case of a successful doctor, grow rich; but the meaning of their profession, both for themselves and for the public, is not that they make money but that they make health, or safety, or knowledge, or good government, or good law."

Defined thus, a profession is clearly impossible without organization. Common standards "for the better protection of its members and for the better service of the public" can be formulated and the service which they contemplate effectively rendered only by group

* Read at the annual meeting of the Society at Madison, Wisconsin, December 16, 1925.

[1] "The Acquisitive Society," by R. H. Tawney, pp. 92-94.

action. The Society of American Foresters was founded to enable foresters to do collectively what as individuals they could do poorly or not at all. It is much more than the spokesman for the profession of forestry; it is virtually its creator. But the Society is not an impersonal affair, a mere piece of machinery. On the contrary it is a living organism which functions only as its members, as you and I, make it. Under our leadership what is it actually accomplishing; what ought it to accomplish? In attempting an answer to these questions let me divide Society aims into four main groups which, while more or less overlapping, are perhaps sufficiently distinct for present purposes:

1. *Development of Standards*

Insistence on high standards of conduct and ability constitutes the very life of the profession. The development in personal character, in breadth of vision, and in master workmanship, which President Mulford last year emphasized so strongly as an individual duty, is equally the concern of the entire group. If forestry is to enjoy the same high standing as the older professions, the Society must insist on equally high personal and professional standards on the part of its members. Laxity in this regard, by lowering the respect in which the Society is held both by its own members and by the general public, will inevitably weaken its influence.

We have always recognized these facts in a rather vague sort of way. So far as personal conduct is concerned we have boasted that foresters are actuated by high ideals, and in a few flagrant cases have resorted to disciplinary action. But we have never made any serious effort to formulate a definite code of ethics, nor have we attempted to reach even an unwritten agreement as to the dividing line between professional and unprofessional practice. In my judgment it is high time to do so. The immediate adoption of a written code of ethics may be neither practicable nor wise, but certainly steady progress in the development of standards through free discussion of specific cases involving ethical questions is essential for the integrity of the Society and for the guidance and protection of its members.

As to ability, more or less definite standards have been established through the grades of Member, Senior Member, and Fellow. Aside from making these standards more definite, the chief need here is to insist on a sufficient background of technical knowledge for admission to active membership, and on a reasonable showing of achievement for

advancement to the higher grades. We must not permit the desire to be democratic and to include all of our friends and fellow workers to dilute our ranks with non-technical men or to cheapen the distinction which should attach to Senior Membership and Fellowship.

2. *Advancement of Forestry as a Science and an Art*

This is the field to which we have so far largely confined our attention. The primary purpose of the Journal of Forestry—now the one outstanding activity of the Society—is to stimulate and record advances in technical forestry. Most of our committees are appointed for this purpose. Individual achievement is recognized by promotion to a higher grade of membership.

All of this is good but it is not enough. Forestry will succeed only if it rests on the solid foundation of established facts and principles and if foresters are thoroughly versed in their application. You know as well as I that if the members of this Society were to be given a free hand to manage the forests of the country exactly as their best judgment dictated, without regard to cost or profits, the results would fall short of perfection. Why? Simply because we lack knowledge and experience. Forestry is not yet either an exact science or a fine art.

I should like to see this Society take the leadership in bringing about investigations in forest production, in forest utilization, and in forest economics, not only by institutions but by individuals, which would be adequate to meet the needs of the situation. We shall never balance the huge deficit between growth and consumption without practicing the most intensive kind of forestry, and such practice is impossible without far more information and more skill than we now possess. The master workman must have a basis on which to build and the opportunity to practice what he knows.

3. *Establishment of Forestry in its Proper Place in the National Life*

This involves public recognition of the meaning of and need for forestry. It also involves public participation in making forestry possible, and if necessary compulsory. Public action is needed both because the practice of forestry is dependent on certain factors, such as fire control and taxation, over which the individual owner does not have complete control, and because it is essential to the economic and social well-being of the country. All of us, I assume, agree to this. Yet as a body we have almost studiously refrained from participation in the development of forest policies or programs.

Other scientific organizations have not been too dignified or too proud to do so. It was the American Association for the Advancement of Science that in 1876, by persistent effort, secured the first Federal appropriation for forestry. The Act of June 4, 1897, providing for the administration of the National Forests, resulted from a report by a committee of the National Academy of Sciences, certain members of which were so active as to cause a United States Senator to exclaim, "Why should we be everlastingly and eternally harassed and annoyed and bedeviled by these scientific gentlemen from Harvard College?" It is that same Academy which today is conducting an investigation of the status and needs of forest research. When the Weeks' Law was under consideration the list of agencies favoring it included such professional organizations as the American Institute of Electrical Engineers and the American Society of Civil Engineers, but not the Society of American Foresters.

Do you realize that in Ise's comprehensive book of nearly 400 pages on "The United States Forest Policy" the Society of American Foresters is not mentioned once except in fine print as the publisher of its "Proceedings?" Space is taken to record the establishment of such organizations as the Iowa Park and Forestry Association, the Nebraska Conservation and State Development Congress, the Paducah (Ky.) Forestry Association, but never a word about the one professional forestry organization in the country.

I do not overlook the service rendered by the few among us who have achieved national prominence, or by the many more among us who have labored inconspicuously but none the less faithfully. Is it not time, however, that the very men who by training and experience are presumably best informed as to our forest problems should take part collectively as well as individually in their solution? Please do not understand me as advocating that the Society embark on any wholesale program of propaganda or political activity. Other organizations are better fitted for that. What I do urge is that we stand up publicly for the faith that is in us, and that we point out goals and ways and means of attaining them; in other words, that we exercise the technical leadership which is so greatly needed.

The so-called "forestry movement" as it exists today is based too largely on uninformed sentiment. Its potential power is tremendous, but it needs to be directed along sane and effective lines. The first step is to bring about a clearer conception of what forestry really

means. So far we have been more successful in emphasizing the need for forestry than in pointing out how that need is to be met. We must make it plain that forestry is more than a matter of fire control, just taxation, and public ownership. These measures are all good and deserve our hearty support. They are incomplete, however, in that, while they pave the way for, they do not insure the application of true forest management in growing the fully stocked, continuously productive stands of desirable species in which we as a nation are or should be chiefly interested.

The Clarke-McNary Act, admirable as it is, does not go to the heart of the problem. The most essential need in forestry today is to bring about the practice of the best possible methods on private as well as public forest lands. I have said, that we do not now know enough to practice as intensive forestry as is needed to balance growth and consumption. It is equally true, however, that we know much more than we practice. To put that knowledge to work in the woods is the immediately urgent task. How this should be accomplished is a question on which there may well be much honest difference of opinion, but of the fundamental need of bringing about the practice of forestry—real forestry—on all of the forest lands of the country there should be unanimous agreement. On this point I should like to see the Society take an unequivocal stand.

4. *Service to Members*

This is a field which has so far been practically neglected. Virtually the only direct service which the Society now renders to its members is to furnish them with the Journal of Forestry and to give them such prestige and professional standing as membership in it may carry. That there is a strong demand for further activity in this field is indicated by the fact that whenever the question of increased dues is under discussion the first question asked by many members is, "What shall I get out of it?" While I do not believe that the rendering of personal service to members is the most important function of the Society, or even that in the long run it will prove as helpful to members themselves as some other activities, there is no question but that the demand is a legitimate one.

Members of a professional society no less than of a trade union have a right to expect their interests to be protected and advanced by it. Because the primary motive of a professional man is service, not profit, this does not mean that adequate compensation should not

be received for that service. The Society should assist its members in finding satisfactory positions for which they are qualified. It should endeavor to see that they receive salaries commensurate with those in other professions; that they are afforded a fair opportunity for work that is really professional in character; that they receive a square deal; and that positions which should be filled by foresters are actually so filled.

Members should, however, recognize the difficulty of accomplishing these objectives and not be disappointed if immediate results fall short of expectations. Service of this sort, requiring as it does full information, often of a confidential nature, good judgment, and rare tact, will prove much more difficult than would appear at first sight. Members should also appreciate the fact that in strengthening the profession along the lines already discussed, the Society is rendering a service which, though indirect, is none the less valuable.

Here then are the chief aims of the Society—to develop standards of professional conduct and ability; to advance forestry as a science and an art; to exercise leadership in establishing forestry in its proper place in the national life; and to render service to its individual members. Together they present an opportunity which should call forth the best there is in us. Proper organization will make possible simultaneous progress in many different fields and will offer ample scope to every member for the full exercise of his own peculiar talents, whatever they may be. I believe, however, that the Society as a whole will accomplish most by concentrating its activities at any one time on the attainment of a few main goals. For the present I suggest these two:

1. To develop thoroughgoing investigation in all phases of forestry. Knowledge of basis facts and principles, now exceedingly meagre, is the only safe basis for forest practice.

2. To bring about the application of existing information in the actual management of both public and private forests. Success in this is the ultimate test of any program or any policy. If the present method of voluntary cooperation does not prove reasonably successful, the Society should tackle fearlessly the question of mandatory control.

Attainment of these aims will obviously require action in other directions. The practice of forestry by private owners, for example, can not be expected unless it is made safe by effective fire control and fair taxation. The Society itself can not function effectively

unless it is greatly strengthened internally. I see no reason why there should not be as many minor activities as the members themselves are willing to undertake and to handle effectively. The more activity the better, so long as it is an integral part of a carefully thought out program.

The effectiveness of such a program, on which we have as yet barely made a start, will depend on the extent to which it receives the support of foresters generally. Just what constitutes a "forester" will doubtless continue a matter of debate. So far as membership in the Society is concerned, it is clear that we shall gain by an interpretation sufficiently broad to include all phases of the profession and sufficiently narrow to insure real community of interest and ideals. We do not wish to limit ourselves to silviculturists or to include all lovers of nature. My own feeling is that the essential qualifications for membership are a full knowledge of and sympathy with the ideals of forestry and the technical ability to engage in the scientific management of forest lands or the utilization of their products. As the organization increases in numbers and broadens in scope, it is quite likely that we shall in time find it desirable to provide for divisions composed of specialists, such as silviculturists, forest economists, forest entomologists, forest pathologists, and experts in forest utilization.

Interest in the Society itself should also be a prime requisite for membership. That interest can and should be expressed in two ways, financially and through active participation in Society affairs. No organization can exist, much less accomplish anything, without funds. But the member whose only contribution to the Society consists in the payment of dues is not doing his full share to make the profession what it should be.

We need a high class executive secretary. We need even more the personal interest and the personal participation of every member in forwarding the Society's program. To employ a secretary, no matter how able, with the idea that all of the rest of us are thereby relieved of responsibility, would be suicidal. The main strength of a professional organization such as ours lies in the enthusiastic willingness of its members to give freely of their thought, time, money, and energy to its support. I hope that the time is not far distant when this willingness can be expressed in action more easily than is now the case. One of the functions of the executive secretary should be to devise and keep well oiled the necessary machinery to give each

member ample opportunity to do his part. Action means interest; united action means power. I can not imagine anything that would do more to give the Society the unity and the force which it so greatly needs and so greatly lacks than to have the entire membership working shoulder to shoulder in behalf of a common program.

Alone, you and I can perhaps accomplish a little; together, we can accomplish wonders. It is still true that in union there is strength. The whole is sometimes greater than the sum of its parts. The future of forestry in this country is largely in our hands; and it is in our hands less as individuals than as members of this Society. The opportunity is clear. Let us prove that we have the vision and the courage to grasp it.

MAN, TEACHER, AND LEADER—FILIBERT ROTH

Professor Filibert Roth, "Daddy" Roth as he was known to his students, died on December 4 at Ann Arbor within a few blocks of the spot where he lived 52 years ago, when as an immigrant boy with a direction tag on the lapel of his little tight coat he came to America.

The master-teacher lays down his pen and chalk; his famous triangle illustrating growing stock he will no more trace on the board; no longer will he deftly and oh, so kindly, guide the rapid fire of discussion among the students of the class, winding up with their disagreement and his wise admonishing, "Doctors disagree, doctors disagree," over selection versus clear-cutting, for instance; never again will he beam and twinkle over his glasses stretched far down on his nose and hold the class in thrall by his remarkable personality long after the hour was up.

Roth was born in Wurtemberg, Germany, April 20, 1858. He came to the New World with his parents after living thirteen years in an old forest and farm community. They settled first in Ann Arbor but soon moved to Wisconsin; and here the boy Roth lived for a time with the Ochsners—playing with the boys who have since become world-famous as physicians. Three years later, when only sixteen, he evidently felt himself self-sufficient and capable to such a degree that he struck out for the West, to the east flank of the Rockies, where prairie and forest meet. It was the call of the frontier, and it never left him. For eight years, during the great formative period of his life, he lived the rough life of a frontiersman, making his living the best he could, most of the time off the country, hunting buffalo, trading, trapping wolves, and he took herds of cattle from Texas to Montana to get the summer feed of the North. He witnessed the quelling of the numerous Indian outbreaks, and that most interesting biological event, the imposition of the will of a strong, resourceful people upon that of a weaker, non-resourceful race, with no League of Nations to interfere. It was this period, 1874 to 1882, that was about the most interesting of the years of the West. Immigrants in innumerable numbers were flocking helter-skelter onto the plains after rich, free land. The Great American Desert, the prairie soil, lured as never did gold. Towns sprang up like magic; and railroads were stretched across the flat open spaces almost overnight.

Deeply impressionistic, this experience never left him; and he obtained thereby a background of history, an understanding of the spirit of American development, as have very few professional men. He himself, at that time in the Gallatin Valley, Montana, laughed in derision when Secretary of Interior Schurtz in 1877 stated that anyone who hereafter cut trees on the public domain would be prosecuted as a trespasser against the United States. "Why," they said, "the fool's crazy. Isn't this a free country? Going to try to stop us from cutting a tree—right up there on the hill, mind you."

He witnessed the change from entirely unhindered exploitation of our resources, through amused tolerance at futile restrictions, to bristling antagonism of first attempts at seriously enforced checks, to actual reservation of the lands, and finally to efficient and effective administration of these reserved lands. He not alone witnessed but actually lived and took part in the change; for he was the first technical forester in charge of the National Forest Reserves.

In 1882 he returned to Wisconsin, lumbered and taught school, and entered the University of Michigan in 1886 and graduated, in arts and science, in 1890. He married Clara Hoffman, also of German descent, October 7, 1888.

Roth, while a student at Michigan, was Assistant Curator of the Natural Museum, and many of the bird and animal mounts are by him with the assistance of Mrs. Roth. He apparently had decided to remain in this field although it is interesting that this frontiersman had done so well in mathematics that he was asked to remain as professor of that science. But, fortunately for forestry, Dr. B. E. Fernow, at that time head of the U. S. Division of Forestry, passed through Ann Arbor, met Roth, and inveigled him in 1890 to go to Washington with him. While at Washington he eagerly studied forestry, reading the German masters; and this study and training under Fernow was the extent of his technical forestry training. Under Fernow, at Washington, he performed several creditable pieces of work. His bulletin on identification and qualities of woods of the United States is still quoted widely, and formed the basis for practically all later works by others on the subject (Roth affirmed, however, that he got most of his information from German texts); he made an economic study of forest conditions of Wisconsin, and his report is frequently referred to even at present.

But his strong suit never was administration or routine office work, and when the Cornell School of Forestry was founded in 1898, with Fernow as the head, Roth went there as Assistant Professor.

That school broke up in 1901, and Roth, out of a job, was made superintendent of the National Forest Reserves, in the General Land Office. Here he was full in the midst of the controversy regarding methods of land disposition. He was there an enemy in Binger Herman's camp.

Foresters of today of high standing were appointed as Rangers by Roth during his brief incumbency, and many of the fundamental policies of administration of the National Forests that have made them the success they are in our Western natural resource economy were put into execution by him.

But the lure of teaching was strong. Several earnest and influential men had been trying for a number of years to introduce a good land and forest policy for Michigan, and as a supplement to their labors secured the establishment of a Department of Forestry at the University. Roth came there in the fall of 1903. In 1913 he was asked to head the newly established Department of Forestry at Cornell; and he and many of his students (who, of course, would follow him) were packed to go, when the Regents of the University of Michigan belatedly recognized his worth and granted him much better conditions and he remained at Ann Arbor.

As the leading technical forester of Michigan he was looked toward to take an active interest in urging forestry measures for the state. He was made State Forest Warden, in charge of the two small state forest reserves then established, "which were little more than experimental areas," and held that position until 1909. Roth needed no urging to get into the fight; and he was in it steadily from that day to the end. The Hon. Chas. W. Garfield, who for years had been foremost in urging forestry for the state, said: "When Roth came, he put a spirit and enthusiasm and training into our efforts, and we seemed fairly to bound along." Others may, like the poet, see and sing, and rouse much enthusiasm for the cause, but it requires the trained artisan, the one who can supply and lay the brick and stones, to establish the edifice that others envision. Roth not only could envision the final structure, but he could supply the mechanical details of raising the structure. He knew how to grow trees.

As Forest Warden, Roth had charge of the two reserves, and while in this capacity he laid down the fundamental ways and means

of rebuilding our destroyed pine forests—fundamentals so broad and far-sighted, yet so simple and sufficient, that his successor, Marcus Schaaf, the present incumbent, has needed to depart but little from the original plans, although the areas under management are now many times larger than then.

In 1908, mainly as a result of his efforts and his untiring exposes of the evils attending the methods used of disposing of the state's tax delinquent lands, a Commission of Inquiry was ordered by the legislature. Upon the basis of the findings and recommendations of this commission an entirely new scheme of handling the bankrupt lands of the state was established, a scheme at once workable and sufficient. The lands were deeded to the state and used for state forest reserves. This foundation for forestry is probably equalled in no state. It is equitable and works automatically, and under proper attitude of the Michigan Department of Conservation would soon give the state some forty or fifty reserves.

In 1921 a new Commission of Conservation was established and Roth, after twelve years on the side lines, part of the time denouncing and part of the time praising (and "praise from Sir Hubert is praise indeed"), was made a member of the Commission and again was in the arena. After two years, however, he resigned and devoted his entire time to teaching.

Roth's particular qualities were his never ending enthusiasm for forestry, his remarkable personality, wit and humor, and his never ceasing activity. It was this very enthusiasm for forestry that was at once his strongest and weakest side. It frequently led him into statements at the time often considered to be absurd but, usually later, held to be the truth. Twenty years ago, for instance, he said that Michigan as a state would be better off, if the whole north country were essentially closed to farming and used for forestry. He was ridiculed to the limit as a result; but interesting here are the recent words of a former president of Michigan State College, a close student of farm economics, who said about this: "So far as I as a farmer am concerned, northern Michigan is dead and now needs only burial. It has been sucked dry; it has served its purpose; and attempts at revitalization are not worth while."

Roth never went half-way in remarks. He was an exhorter of the faith, a powerfully inspired preacher, and often impatient with those who refused to believe. To him the need of forestry was so obvious, and simplicity of the operation so apparent, that he could see no reason

for lagging back. It has, however, perhaps been this same characteristic, impulsive, relentless American push, didactic of speech, that has sent forestry ahead with the remarkable speed it has attained in our country in the past two decades.

In this same connection, and this will illustrate Professor Roth's all-consuming desire to see forestry succeed, it is interesting to note that for several years he gave his State Forest Warden salary to the young man who was instructor in forestry at Michigan. He did this to retain the instructor who was receiving a ridiculously low salary.

But this same spirit, this unquenchable flame, acted marvelously in the class room. It transformed young men from unknowing and largely uncaring in forestry to enthusiastic doers. The students adored the man, simply and unquestioning; he was in all truth daddy to them; and since he was by every utterance a personification of all that is best in forestry, liking him they liked the profession. The success that Michigan graduates have had in silvics, management, silviculture, and forestry surveys is attributable largely to this enthusiasm and personality of Roth's.

To repeat, he was the master-teacher in a period when right minded teachers were of the greatest need. He joyed in teaching. When the U. S. Senate Committee, investigating forestry of the country, asked Roth, who appeared before them, his business, he replied: "I am a schoolmaster."

He was well qualified. He had an uncanny ability to make difficult and complex propositions appear simple. He brought forestry to the students as a perfectly feasible, matter-of-fact business affair. He himself saw forestry in all of its phases with great clarity. He recognized that our task as foresters is to grow trees and to grow them well. To do so, one must know trees and stands. "Ask the woods," he repeatedly told his students. He recognized that such matters as lumber salesmanship, recreational engineering and wood preservation, while unquestionably important in our general forest economy, were not primarily important to us as forest builders. To Roth, silviculture was the flesh and bone of forestry, and the student at Michigan in every forestry course was tied up to that subject continuously.

He had a mania for making things simple. "Now," he would say in that kindly way of his, "just what is it you are trying to find out?" He could shuck the husk off a problem and expose the kernel of it in the shortest time. He cut through reams of devious, intricate reasoning in a manner apparently intuitive—a manner peculiar to one who

was once considered a reasoning, slowly stepping mathematician. And when found, he could express himself, and describe what he found, in the most simple language. Big words he considered an affectation, they bored and irritated him. A square was a square, not a quadrate. He never strove for effect nor style. His sentences seem angular and of an unnecessary kinkiness, but they do go out in a forth darting sort of way directly to the point, and most certainly express his thoughts.

Here is a quotation, for example, from one of his letters to a young forester engaged in technical work for a state:

"The motto in all your public work must be:

1. Keep it simple.
2. Make it *fool proof* so that the politically elected person can do the essentials.
3. Let freedom reign.
4. The state better lose than rob.

We go back to the masters. Survey, subdivide, describe, plan, work, is still *the* sequence.

His incomplete, abrupt sentence construction enabled him to carry on, long-handed (he never used a stenographer), a voluminous correspondence.

His choice of words aided him greatly in apt expression. The term "scavenger-logging," for instance, at once short but remarkably expressive of lumbering on the cut-over lands, is an illustration.

His wide experience, not only in political matters, both of state and of nation, during crisis periods, but also in the virgin forests of the entire country, preceded by his years of boyhood in the well-kept, long-cared-for, forests of southern Germany, gave Roth an experience background for his teaching work that is almost unparalleled. He knew forestry instinctively; he felt it; all his life it was a part of him. We have but few American trained foresters of this kind but must wait for those youngsters now growing up on the National Forests. He correctly evaluated the weight of forestry measures unthinkingly. Where most of us fumble or grope he traveled easily and saw clearly.

History is too often a string of half truths. Prejudices bias the most honest of well meaning minds, deflect them from straight thinking. The historian too often has an iron of his own in the fire, or a personal grudge or pet idea to substantiate.

In a profession like forestry, the treatment of which is largely empirical and the results of which are many years in coming, history and experience if read correctly are not only valuable teachers but truly well nigh indispensable.

It was Roth's fortunate ability to be able to scan his past experience impartially and impersonally, and accurately foretell the future or explain the present, as a true historian and molder of policies should. The students took his words as of great wisdom and knowledge, and, more than that, of great understanding, given kindly and sympathetically. They accepted his ideas and carried them away, believing them, hugging them as the truth. That they were, perhaps, impractical to present day conditions did not in the least impair their value or truthfulness. They told the students their ideals; they were stars to which they hitched their wagons; and, like stars, though they were often overcast or dim and though they may never be reached, they tended to guide the students steadily and truthfully on their way.

Roth held that it is the license and the privilege, yes the duty, of a teacher to look to the Utopian, to be called impractical, a visionary, and to be scolded as an academic mind by the practical fellows. He felt that no one who had a noble cause such as forestry should be too proud to fight. He knew that we must establish a norm, a standard, for us all to work by; for he understood full well that the models will be trimmed and pared to the quick by the workers without. Especially is this true in our present great rush to put forests under administration and protection, even at considerable sacrifice. There are plenty to say that the technical phases of forestry are too impractical for application; there are few who can, without fear, constantly abide in the higher phases.

And now Roth is gone. A noble heart stopped beating. A great light went out. In this still transitory stage of our forestry movement, when we still must be constantly reminded to hold fast to our ideals, Roth's voice will be silent.

An inspiring battler always, knowledgeful, experienced, of deep and kindly understanding, he had a place which no one else can fill.

DRAINAGE OF SWAMP LANDS FOR FORESTRY PURPOSES

By Prof. Gustaf Lundberg*

Translated by J. H. Allison
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It has been calculated that the part of Sweden now used exclusively for forestry purposes amounts to about 76,570,000 acres, or about 74 per cent of the country's land area. However 23 per cent of this area, or about 17,300,000 acres, is classed as unproductive forest land. By far the greater part of this unproductive land is composed of bog or fen lands. Also, on considerable of the forest lands which are classed as productive, the growth and development of the forest is greatly reduced because of the swamp or peat formation which is still going on. According to the calculations, which are approximate only, of the Swedish Forest Service, the forest lands of this latter character, that is, those which are still becoming swampy, cover an area of about 6,175,000 acres. Since the volume and value of the current growth of the forest upon these lands can, in most cases, be increased many times by simple drainage, and since a large part, in all probability, a third and perhaps even a half of the real bog (peat)[1] lands can be made profitably productive by means of drainage, it can be easily seen that the drainage of forest lands in Sweden is an important factor in the efforts which are being made to increase the country's forest production.

The drainage of forest lands, on any considerable scale, began during the second half of the 19th Century. Nearly all of these earlier drainage operations were located in the southern and central parts of the country. In several places one can find peat swamps that were drained at a much earlier date and that are now covered with beautiful forests, but if one examines the history of these cases closely, one usually discovers that the original object of drainage was to make these peat swamps cultivable and they were occupied by the forest after attempts to cultivate the land had ceased.

A tabulation of the amount of money expended by the Swedish State, upon the State owned forests,[1] during the last half century ought to give a fairly accurate picture of the interest taken in forest

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[1] Using the word "Forest" in the same sense that the words "National Forest" are used by the U. S. Forest Service.

drainage by Swedish Foresters. The State Forests include 15.8 per cent of the nation's productive forest land.

EXPENDITURE FOR DRAINAGE OF FOREST LANDS SINCE 1875

1875-1880,	average	annual	expenditure.....	$ 1,240.00
1881-1885,	"	"	"	945.00
1886-1890,	"	"	"	2,160.00
1891-1895,	"	"	"	4,050.00
1896-1897,	"	"	"	5,125.00
1898-1899,	"	"	"	27,400.00
1900-1905,	"	"	"	53,275.00
1906-1910,	"	"	"	52,800.00
1911-1915,	"	"	"	62,900.00
1916-1920,	"	"	"	115,825.00

According to a report prepared by the Forest Owners Association of Sweden, for distribution at the 1923 Gothenburg Exposition, the companies owning forest land, this form of ownership covering 28.1 per cent of the country's area of productive forest land, during the decade 1911-1920, constructed annually an average of 1,364 miles of drainage ditches at an average annual cost of $201,803.13. Thus the average cost of this ditch construction work was $147.14 per mile, or about 8.2c per yard. These figures include the improvements made in stream courses within and near the lands drained. On the average 66.2 yards of ditch are required to drain an acre of swamp land. Applying this figure to the mileage of ditches constructed annually given above it will be seen that the private companies drained an average of 36,062 acres per year, or during the 1911-20 decade, a total of 360,620 acres.

In connection with the drainage of privately owned forest lands, one must mention the late Dr. Frans Kempe who was president of the Mo & Domsjo and Gidea & Husums Companies between 1897 and 1917. These companies own a total area of about 1,235,000 acres, all located in Norrland (northern Sweden). During the twenty years that Dr. Kempe was president of these companies, they constructed a total of 7,378 miles of ditch at a cost of $708,750. The area thus drained amounts to almost 200,000 acres.

Although the amount of money spent on the drainage of forest lands by both the State and the private owner is very considerable, considering Swedish forest management conditions, yet only an infinitesimal part of the swampy area susceptible to profitable drainage

has yet been drained. The drainage undertakings already completed indicate very clearly that drainage, when suitable lands are chosen, is a very profitable undertaking, even though it may take a long time to amortize the costs involved. One of the greatest obstacles to the further drainage of forest lands in Sweden is the lack of available capital, especially by the private companies,[2] for such undertakings.

DIFFERENT TYPES OF SWAMP LAND SUITABLE FOR DRAINAGE

From the drainage ditch technique point of view, swamp lands should be divided, according to their bottom (bed) topography, into two chief types, namely, the *"bowl" or "land locked" marshes* (skalmyrar) and the *"level" marshes* (planmyrar). By the term "land locked" marshes is meant those in which the peat formation originated in bowl like hollows sunk into the mineral soil. These land locked hollows have no outlets. By the term "level marshes" is meant those where the peat formation originated upon level or sloping land. Of course many peat bogs include both types. That is, for instance, a land locked hollow may become filled with peat, and then the peat may spread out over the borders of the hollow, thus both types of marsh becoming represented in one. A peat formation advancing out into a lake is classed as a special form of the "bowl marsh." Here, along the advancing edge of the bog, peat formation takes place under water.

The "land locked" marshes, with the exception of those parts of them which are advancing into lakes, are always, from the forest production point of view, of very much poorer quality than the "level marshes." The poorer quality of the "land locked" marshes is due to the composition of the peat which is found in them as compared with that found in the level marshes. The peat found in the "land locked" marshes is predominantly composed of dense, tussock forming sphagnum, which is usually much poorer in plant food material and more difficult to humify than the peat found in the "plain marshes" which has been formed under more favorable water circulation condition. The "level" marshes, principally because of the much greater rapidity with which the crumbling of the peat takes place after drainage, therefore give, upon being drained, land which has a much higher forest production capacity than do the "land locked" marsh lands. From the forest production point of view, the peat composed of plants growing in the lakes and actually

[2] Several of the large companies had to secure extensive loans to carry them over the 1919-23 depression period and they are paying 7 per cent on many of these loans.

formed under water is of as high and sometimes of higher value than the peat found in the "level" marshes. Whether or not the peat formed in lakes is of higher value for forest production depends upon the circulation of the water in the lake and the local geological structure.

But the suitability for drainage of any particular marsh does not depend entirely upon the forest production capacity of the land after it has been drained. The cost of drainage depends almost entirely upon the physical (topographic) features of the marsh and the land surrounding it. The per acre cost of draining the "land locked" marshes is, as a rule, much greater than that for the "level" marshes. This is partly due to the fact that much more comprehensive outlet ditches are required for the former than for the latter, because the mineral earth dams surrounding the former must be completely cut through in order that drainage may be complete. Also the "land locked" marshes often require a much more comprehensive system of ditches for the collection of the rain water which reaches the surface of the marsh than do the "level marshes." This is because the very slowly rotting peat found in the "land locked" marshes soaks up and very tenaciously holds onto the rain water which falls upon it or runs over it. The fact that the "land locked" marshes, as a rule, with certain exceptions, develop into poorer sites for forest growth than the "level marshes" makes them, in most cases, unsuitable for drainage undertakings. On the contrary, the "level marshes" are more suitable for drainage undertakings because they can be drained more cheaply, will develop into better sites and become productive much sooner than the "land locked" marshes. Yet the suitability of even the "level marshes" for drainage varies widely.

In order to more exactly characterize the different swamp types, one must describe the plant communities which are found in them. These communities, through their ever varying composition, can, quite naturally, be divided into an almost innumerable number of types by one who is pursuing this subject as a special science. From a forestry point of view, however, one can narrow these variations down to the four following types.

I. *Hogmossar ("High peat bogs").* The floor of this type of bog always takes the form of a bowl-like hollow sunk into the mineral soil. It never has an outlet and often the surface is higher in the middle than around its margins. This last characteristic pertains especially to the bogs of this type found in southern and central Sweden, but much less frequently to those found in the northern part of the country. The

layer of vegetation at the surface of the bog is made up of a dense, very often strongly tussock forming species of sphagnum. This type can be subdivided into:

a. Sphagnum bogs without a surface vegetation cover worth mentioning but with a surface characterized by tussocks with cotton grass *(Eriophorum vaginatum)* and bullrushes *(Scirpus)* growing in it.

b. Brush covered bogs characterized by a surface cover of heather *(Callum vulgaris)* or Labrador tea *(Ledum polustre),* together with dwarf birch *(Betula nana).*

c. Pine bogs, characterized by a surface cover similar to that found in b, together with a forest cover of pine *(Pinus sylvestris).*

Among the bogs described above one finds two special forms going under the names "flark" and "holjemossar." The so-called "holje" bog refers to a bog overgrown by a soft, wet sphagnum while the "flark" bog refers to one which lacks a true surface vegetation, but has its surface covered only by a blue green algae or a slime, thus being a bog which has not yet been completely transformed from pond into bog.

II. *Flackmossar (Level bogs).* As a rule, the floor of this type of bog does not take the form of a bowl like hollow, sunk into the mineral soil, but instead takes the form of a gentle to moderate slope. The principal exceptions to the slope type among the class of bogs are those which are extending out into lakes, in which the bottom must assume the bowl-like form. The surface of this type of bog never rises toward the center, that form of surface being a characteristic of most of the högmossar (high bogs). The surface vegetation is made up of the species of sphagnum which are thinner and do not build up hard peat. They are usually poor in lime. They can be separated into

a. *Sedge bogs* with a surface cover of true sedge *(Carex).*

b. *Brush covered level bogs* with sweet gale *(Myrica gale)* in the surface cover together with occasional dwarf birches *(Betula nana)* and willows *(Salix)* as the vegetative cover above the surface.

c. *Hardwood bogs* with the forest cover composed of a mixed stand of birches and conifers (pine and, frequently, spruce).[3]

III. *Swamps.* Here the topography is similar to that found in II. The surface cover is made up of brown (true) mosses *(Ambly*

[3] This type of bog is very similar to the American "muskeg."

stegium) or of brown mosses mixed with scattered sphagnum, or there may be no surface vegetative cover whatever. This type can be separated into

a. *Sedge swamps* with a surface cover made up of sedge *(Carex)* in which one may even find scattered grass upon the best sites.

b. *Brush swamps* which very often are more spotty than the sedge swamps. The surface cover is made up of sweet gale *(Myrica gale),* while the brush cover is made up of dwarf birch *(Betula nana)* and willow *(Salix).*

c. *Forest swamps* with a cover composed of trees. They are named, according to the predominating species, *Alder swamps, spruce swamps, hardwoods swamps, mixed forest swamps,* etc.

IV. *Swamp forests (Swampy woodlands)* which may be either a peaty or a swampy type. The former type is characterized by a dense, often tussock forming, sphagnum *(Sphagnum acutifolium,* for example) in the surface cover, while the latter by thinner, not tussock forming, sphagnum *(Sph. girgonsohni, augustifolium or Russowii)* and hair moss *(Polytrichum commune).* The peaty type is most often developed on bed rock or in outletless land locked hollows in the uplands. The swampy type is found on level or sloping lands, usually upon the better mineral soils.

These swampy forests are separated from the swamps overgrown with forests and the peat bogs by the nature of the peat. In the case of the swampy forests, peat formation has ceased, while in the case of the forested swamps the forest has come in during a recent stage of forest formation. In addition, the depth of peat in the swampy forests is usually less than in the forested swamps and it is less soft.

Although the cost of drainage, in each particular case, due to local conditions such as the extent and form of the swamp, the condition of the outlet, etc., can vary within wide limits for the same type of swamp, yet one can group the different types of swamps economically suitable for drainage in the following order, beginning with the most favorable ones:

Swampy forests,
Forest swamps,
Hardwood peat bogs,
Brushy swamps,
Sedge swamps,
Brush covered level bogs,
Sedge bogs,
Peaty swamp forests,
Pine covered bogs,
Brush covered bogs,
Various types of tussock surfaced bogs.

It ought to be noted, however, that the better peaty swamp forests and pine covered bogs, from a financial (income producing) point of view, return the drainage costs involved much more quickly than the types not already covered by trees at the time of being drained, and therefore, often should be placed before the brush swamps in the list given above, and this is generally done in districts where the birch has little or no merchantable value. If not controlled by seeding or planting operations the first forest generation on the treeless swamp lands, after their drainage, will be predominantly composed of birch. The experience with sedge bogs is somewhat different in northern as compared with central Sweden. In central Sweden (The "Bergslags" or Dal Valley district) the sedge bog is very rapidly covered by forest through natural reproduction, but in Norrland (northern Sweden) it is often very difficult to get such bogs stocked with forest trees. Often the northern sedge bogs, upon being drained, show a strong tendency toward becoming covered with hair moss *(Polytrichummatta)* which makes it difficult for tree seedlings to become established.

DRAINAGE TECHNIQUE

The reasons why the stands of forest trees do not do well in the swamps can be summed up in a few words thus:

The water in and of itself does not injure them, but in the peat bogs the water is stagnant, which brings about a lack of oxygen in the peat. This lack of oxygen in the soil of the bog, through its asphyxiating effect upon the roots, confines them to a more or less superficial layer, where they ultimately exhaust the available nourishment and also are periodically exposed to being dried out. All kinds of swamps are colder and poorer in available plant nourishing material than other locations. The lack of oxygen in the water found in peat is due partly to the fact that the water does not move and hence does not come in contact with the air, partly due to the fact that the peat, through chemical combination, hangs onto the water with great tenacity.

The first object of drainage, therefore, is to do away with the stagnation of the water in the bog, that is, to bring it into motion. This is brought about partly through the collection and diversion of the water moving into the marsh from the adjacent land and partly through the improvement of the natural drainage conditions within and from the marsh itself, by means of which the rainwater is more rapidly drawn off.

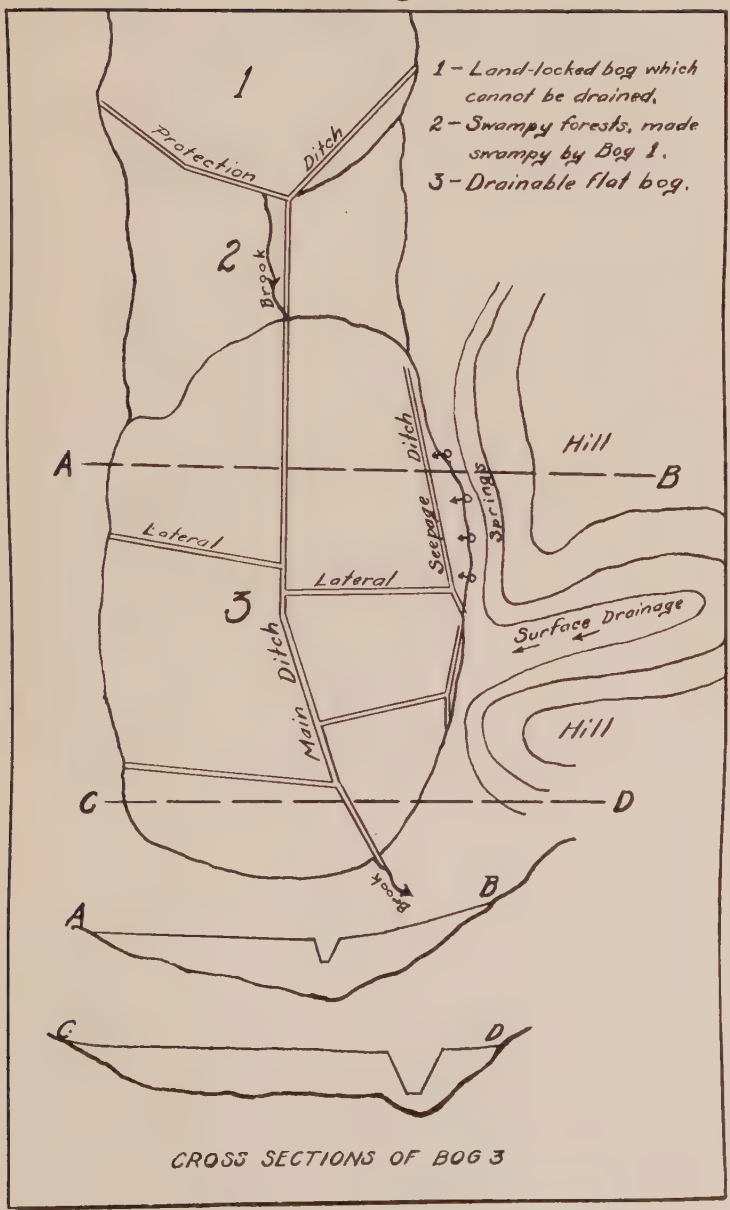
As a consequence of the digging up of some of the peat through the digging of the ditches, the peat decaying bacterial flora is brought to life. As a result of this operation, part of the peat crumbles (rots) and thereby releases a large part of the plant nourishment material which it contained. At the same time the peat no longer asphyxiates the tree's root system, and hence becomes a suitable site for a stand of forest trees. With the arrival and development of the forest stand upon the swamp land, the airing out and rotting (crumbling) of the peat takes place at a more rapid rate. The trees, through their transpiration, consume very large quantities of water. The water thus consumed apparently is in direct proportion to the volume growth which the stand is making. Hence the forest itself is man's best ally in drainage work.

The location of the drainage ditches. If the cost of doing the work is given no consideration, any marsh can be drained. If, on the contrary, the drainage work is to be carried on according to the "law of least cost," which is usually necessary for economic reasons, one must have an accurate knowledge of the quality of the peat, of the topography of its bed, of the runoff and outlet conditions, etc., and at the same time one must use good judgment in locating the drainage ditches in such a manner that they will accomplish as much as possible at a minimum expense. This aim is usually accomplished by first taking such measures as will bring about the removal of the water which obviously causes the combination of swampy conditions, and by taking care of the more doubtful causes by later extensions of the drainage system.

Based upon the purpose for which the drainage ditches are built, they can be divided into two different classes, namely; (1) the "laggdiken" (seepage ditches), and (2) the "avloppsdikena" (main ditches). (Figure 1.)

The "laggdiken" (seepage ditches) are located at or near the edge of the marsh for the purpose of collecting the water flowing into the marsh from the higher lying lands surrounding it. The water to be thus collected may be either rainfall or spring water, or both. These seepage ditches should never be dug until after it has been ascertained that they are actually needed, which can be accomplished by an examination of the rising ground at the edge of the bog. If considerable drainage into the bog is taking place, especially if the drainage is in the form of spring water, the peat formation always extends itself up on

FIG. I



LOCATION OF DITCHES FOR SWAMP DRAINAGE

the slope above the real edge of the bog. Thus, wherever water is draining into the bog, the surface of the peat along that edge is higher than out in the middle of the bog. But where there is no such considerable inflow of water, the surface of the peat along the edge is at the same level, or even lower than in the center of the bog.

Another type of ditch, comparable to the border ditch, is the so-called *protection* or *isolation* ditch, by means of which such parts of a bog as do not justify the cost of drainage are isolated from those parts which do.

Since the flow of water of the greatest importance in the drainage of the marshes, except the flow over the surface, takes place in the superficial layer of sand or mineral earth lying immediately under the peat itself, it is very important that both the "seepage" and "protection" ditches be cut entirely through the peat. Otherwise they will *not* be effective. Hence great care should be taken to locate these ditches where the peat can be cut through by a ditch of reasonable depth. If springs are the source of the inflowing water, it is particularly important that the seepage ditches penetrate into the mineral soil beneath the peat, even if doing so requires the digging of the ditch to a greater depth than usual. As a general rule, the "seepage" ditches should be located along the line of contact between the level surface of the bog and the rising surface of the peat that has extended itself up the slope adjacent to the bog. If the "seepage" ditches are placed too far out on the bog, then the width and consequently the area, of the undrained belt will be increased, while if they are placed up on the slope around the bog, much water may pass underneath them and hence they may accomplish practically nothing.

Main Ditches (Avloppsdikena) (Figure 1). These ditches act as outlets for the lateral ditches and for the rain water which falls directly upon the marshes, thus preventing it from stagnating. Therefore it is of great importance to lay out these ditches in accordance with the bog's *bottom* rather than its surface topography. These ditches ought to follow the direction of the chief slope of the bog (that is, across the contour lines) through its deepest parts. Also the main ditch should reach some satisfactory stream course by the shortest possible route. The reason why the main ditch should pass through that part of the bog where the peat is deepest (and in so doing, follow the bog's bottom topography) is because the surface of bog assumes more and more the form of its bottom (bed) as the drainage work is successful and the

peat formation. In order to keep the cost of drainage at a minimum, part of the bog the water on the surface of the bog produced by rain and snowfall will ultimately be unable to find a satisfactory outlet and hence will soak into the peat instead of running off, thereby re-starting peat formation. In order to keep the cost of drainage at a minimum, no more main ditches than are absolutely necessary should be constructed, but instead as many laterals as possible should drain into each main ditch.

In order to draw off quickly the rain water which falls directly upon the surface of the bog, the so-called "tigdiken" ("laterals") are used. The word "tig" is the old Swedish name for the small field which lies between two parallel drainage ditches.[4] In contrast to the

FIG. II.

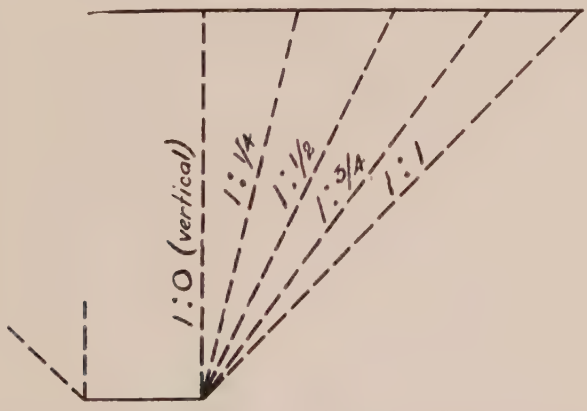


Diagram Showing Various Ditch Slopes

main ditches, the laterals ought to follow the bog's contours as nearly as it is possible to have them do so, and still have sufficient slope for drainage. In this position they will collect water most effectively because the water in and on the bog always moves in the directon of the bog's principal slope. Lateral ditches are necessary in large bogs but not always in small ones. The better the slope of the bog and the shallower the peat, the less is the need for side ditches and the farther may they be located apart. In peat lying on very level hardpan clay or in bogs where there is a great depth of sphagnum peat, effective drainage requires that the laterals be located at intervals of not more than 40 or 50 yards, while in bogs of better slope, with shallower or more dis-

[4] Much of the cultivated land of Sweden is drained by open ditches and is thus divided up into very small fields.

integrated peat, they may be located at 100 or 150 yard intervals, or often they may be entirely unnecessary, even in relatively large bogs. In proportion as the bog is occupied by trees and as the transpiration through these trees increases, and by so doing, removes a very considerable volume of water, the laterals become less and less necessary and may finally be abandoned altogether.

Dimensions of the drainage ditches. (Figure II.) In cross section the ditches are usually given a trapezoidal form, more rarely, a rectangular one. That is, in firm, undecayed sphagnum peat, rock, etc., the ditch wells are perpendicular. Elsewhere they are sloped. The slope of the ditch wall is recorded as the proportion between the vertical and horizontal planes covered by the slope. Thus, a 1 to 1 slope indicates a slope angle of 45 degrees. Since the effectiveness of the forest drainage ditch is dependent upon the depth to which it is forced one ought, for reasons of economy, to use slopes as steep as possible, considering the permanence of the ditch. A ditch 3 feet in depth with a bottom width of 1.0 feet and having a 1 to 1 slope calls for the excavation of 60 per cent more material than a ditch of the same depth and bottom width but having a 1 to 0.5 slope. In southern and central Sweden a slope of 1 to 0.75 is now most frequently used, while in Norrland (northern Sweden), especially during recent years, a slope of 1 to 0.5 is being used. In the softer or more decayed peats and also in the sandier soils a 1 to 1 slope is usually used while in firm and undecayed sphagnum peat vertical walls, the slope being 1 to 0, are used. In the sphagnum peat it has been found that vertical walled ditches resist frost deformation better than those with sloped walls. The slope of the walls of the laterals which need not be maintained in the future, after the forest has become firmly established, is usually made steeper than that of the main ditches which must be maintained in the future.

The depth of the drainage ditches is determined as much by the purpose for which they are being constructed as by the depth of the peat. The "protection" ditches ought always to be cut entirely through the peat and in addition for several inches into the underlying mineral soil in order to be effective. The depth of the outlet ditch is determined, in the first place, by the depth of the side ditches leading into it. In the second place, its depth is determined by the type of bog which it is to drain. If the bog to be drained is in a land locked hollow, the chief purpose of the main ditch will be to break through the mineral soil dam surrounding the hollow so that the stagnant water in the bog may be

drained out, and to accomplish this purpose the outlet should be wide and deep enough to reach the bottom of the deepest parts of the peat. Usually, however, this can not be done at a reasonable cost and hence it has become general practice to limit the depth of the ditch to about 5.0 feet and to deepen it later on in proportion to the distance which the peat settles as it becomes drained and decayed. But in the land locked hollows the peat, for the most part, is composed of only slightly decayed sphagnum, which, for economic reasons, is not suitable for drainage. Even on the level or sloping bottomed peat lands where the depth of the peat exceeds five feet, but which, from other points of view, are suitable for drainage, it has become customary to limit the depth of the main ditches to four or five feet. Later on these ditches are deepened from time to time in proportion to the distance which the peat settles as it dries out and decays. By this method, the amount of material to be actually excavated is very considerably reduced, because of the reduction in the top width of the ditch which it makes possible, and the reduction in the material excavated thus provided for results in a reduction in the total cost of carrying out the drainage undertaking.

On peat lands where it is necessary to have laterals, the best results can be obtained by cutting these ditches clear through the peat layer, but when this can not be accomplished by ditches five feet deep, approximately the same result can be accomplished by putting in a somewhat denser system of side ditches dug to a depth of three or four feet.

It is not worth while to put in ditches less than 1.25 feet in depth because they fill up too quickly.

For practical reasons, the bottom width of the ditches is usually 12 inches, which is the same width as that of the blade of the common spade. A greater width is used only for the larger ditches designed to carry large volumes of water, or for ditches dug in very loose soil.

Ditch Grades. The less water a ditch carries, the greater is the need of a sufficient grade to keep the water moving in order to prevent it from stagnating. For the smaller ditches the grade ought to be at least 1 in 300 or 1 in 400, while for the larger outlet ditches the grade can be reduced to 1 in 500 or even 1 in 800.

Cost of Digging the Ditches. In Sweden ditch digging is always paid for by contract. The contract price is usually stated in terms of running yards (meters). It is calculated on the basis of the ditch's

cubic contents and the kind of soil to be excavated. One can make the following assumptions.

The lowest excavation costs per cubic yard apply to ditches which have a depth of about three feet. If a greater depth is used, the proportional amount of work involved in digging the ditch is increased somewhat by the fact that in the deeper ditches it is more difficult to throw out the excavated material and to get it away from the edge of the ditch. If the depth is less than three feet, the work is again increased per yard of cubic material moved by the relatively greater amount of surface clearing and slope smoothing that must be included in the work. The labor cost per cubic yard of material removed for digging shallow ditches, say for those about 18 inches in depth, especially those located in the easily excavated soils, may amount to 30 to 35 per cent more than the cost for the normal ditch depth (3 to 4 feet). On the contrary the percentage increase in the cost of the deeper ditches does not begin until the depth of the ditch exceeds 4½ feet. Thus the increased cost per cubic yard of material excavated for a ditch 6 feet in depth amounts to about 10 per cent over that of a ditch of the normal depth of about 3 feet.

At the most advantageous depth, about one yard, one can calculate on the average, that a Swedish laborer will excavate in the various classes of soil, per eight hour day, the following cubic volumes of ditch material:

In clean, firm peat containing practically no roots or stumps—about *18 cubic yards per day.*

In the less firm swamp forest peat lying on a loose sand or gravel bed, with some roots and stumps intermixed—*about 13. cubic yards per day.*

In the stonier moraine land where the peat is mixed in with a large number of roots and stumps, and also in the soft, disintegrated peats containing both roots and clay—*about 8.5 cubic yards per day.*

In the harder packed clays mixed with stony gravel, in very stony moraine soils, and also in very wet mud containing roots and resting on a stony bed—*about 5.25 cubic yards per day.*

In very stony land, containing a little soil—*about 4.0 cubic yards per day.*

In solid rock—*1.0 to 2.5 cubic yards per day.*

Various Rules Applicable to Ditch Digging. In digging the ditches, the work usually begins at the lower, or outlet, end of the system and

continues toward the upper end of the area to be drained. When this procedure is followed, one will usually have the least amount of trouble with water. Occasionally, where the slope of the area to be drained is especially great, it is best to ditch the higher lying areas first, thus letting the mud run out over the lower lying areas before they are ditched. This procedure prevents the early silting up of the ditches in the lower part of such an area. In order to prevent the falling back into the ditch of the material dug out of it, all such material should be thrown at least 18 inches from the edge of the ditch. Along the smaller outlet ditches the material dug out of the ditch ought to be thrown alternately on one side and then on the other, for distances of not more than 20 yards at a time. By so-doing the rainfall water will drain into the ditch most satisfactorily. Along all protection, seepage and lateral ditches which run across slopes, the material taken out of the ditches should always be placed on the lower side of the ditch. But even here openings should be left in this piled up material at about 20 yard intervals so that any water which accumulates behind these dikes may flow into the ditch. Perhaps the best thing to do with material taken out of the ditches would be to spread it over the land adjacent to the ditches, but this is rarely ever done. The edges and slopes of the ditches should be carefully freed of projecting stumps, roots and rocks. Finally, at least along all the larger ditches, the forests should be cut away from the edge of the ditch for a distance of at least one yard on each side of the ditch.

The Cost of Drainage Work. It is practically impossible to give an average cost per unit of area, for drainage which will apply to all of the various swamp types because the costs vary with the particular conditions which pertain to each individual case. The form and size of the bog have a marked influence on the cost of drainage. The smaller ones are always more expensive to drain, per unit of area. The cost of digging the outlet ditches varies greatly and is dependent upon the topography of the bed of the bog and upon the length of the true outlet and the kind of land through which this true outlet must be dug. Also if it is necessary to blast out rock or boulders, the cost will be markedly increased. Finally the length of ditch required per acre of drained land may vary from 65 to 175 or more yards.

As a rough average, however, it should be possible to drain the better swamp forests and swamps at a cost corresponding to four to eight days' work per acre, and the poorer swamps and the level bogs at

a cost corresponding to 8 to 12 days' work per acre; while the land-locked bog types can rarely ever be drained at a cost of less than 12 to 16 days' work per acre, which cost, from an economic point of view, makes it practically impossible to drain these types of bogs.

THE MANAGEMENT AND PRODUCTION CAPACITY OF DRAINED LANDS

As has already been indicated, the forest itself, through its consumption of water to satisfy its transpiration requirements, is man's best ally in drainage work. For this reason, it is of the greatest importance to retain the forests already on the bog at the time it is drained, even though it is of poor quality. Everywhere experience has shown that a heavy cutting away of these poor quality advance stands in order to prepare the way for their replacement by more valuable artificially established stands is a highly uneconomical undertaking, and the removal of these advance stands actually delays the drainage of the marsh lands. Moreover the poor quality stagnant forests growing on undrained marsh lands have a very great, often very much underrated, capacity for recuperation, which brings about, on their part, a marked increase in growth after drainage and therewith water consumption which would not be reached by a new stand for many years. One of the important results of the removal of large quantities of water by transpiration is the speeding up of the disintegration of the peat masses, which is accompanied by the appearance of much natural reproduction, especially of spruce, in the small openings. Finally there comes a time when the less valuable parts of the advance growth may be cleared away by successive improvement cuttings, thus freeing the new generation. In the meantime, however, the odd dwarf trees on the marsh, which were practically valueless at the time of drainage, have often developed in size to the point where their value will, to a marked degree, cover the cost of drainage.

But it is very easy to get even the bare marsh lands of the better types, such as the sedge and brush swamps, the brush covered level bogs, and, in central Sweden, the sedge bogs, stocked with natural reproduction. The birch, above all other species, is of importance in forming the first forest generation upon drained lands. However, if there are any seed trees within a reasonable distance, pine will also come in along with the birch. Assuming that there are scattered spruce seed trees within a reasonable distance, spruce will seed in densely as undergrowth as fast as the more rapidly growing birch are removed through successive thinnings. As the result of successive improvement cuttings, the birch

stands will gradually be transformed into spruce stands or stands of mixed pine and spruce.

The value of the birch in the first tree generation on the drained land is based upon the fact that this species comes in easily and rapidly through natural reproduction and also upon the fact that it grows very rapidly in youth and thereby quickly brings about the removal of a large volume of water through transpiration. In addition the birch leaves, which fall upon the ground, help markedly in bringing about a rapid improvement in the condition of the soil. In this respect the birch is far more valuable than the needle trees.

Since birch is the most important species in the first tree generation after drainage, it is very important in connection with the income producing capacity of the drained lands that there should be a market for fire and charcoal wood because the birch is almost entirely used for fuel in some form or other.

As a general rule for the care of the forest on the drained lands it is important to thin each stand at *frequent intervals*. If these thinnings are heavy they should bring about a great increase in size of the crowns of trees left. If such an increase in the size of the individual crowns is not brought about, the thinnings will result in violent interference with transpiration which will cause a marked reduction in the consumption of water. This *marked reduction* in the consumption of water must be carefully avoided and hence the thinnings must be managed in such a way that it *will be avoided*. While in central Sweden, one is satisfied if he can thin each stand located on the better mineral soils at 10-year intervals, one must try to thin the stands on drained lands at five-year intervals.

While, as already pointed out, one can depend upon birch, through natural reproduction, to stock such marsh lands as, on the whole, it pays to drain, yet there are many places where the birch is unsalable and where, on that account, in order to have the drained land produce income as soon as possible, it is important to introduce, by artificial measures, the coniferous species as rapidly as possible. In these situations, the pine is always the first generation tree, because, on account of its great susceptibility to the summer night frosts, spruce can rarely ever be successfully established on the marsh lands until after they are covered by a screen of trees.

In artificially establishing the forest on the marsh lands broadcast seeding, without preparing the land, has been used with good success.

The best results are obtained by doing this seeding on top of the snow near the end of the winter. Often, in order to reduce the cost, seed of low germinating capacity, which has been sorted out of good seed, is used. However a surer and quicker way of establishing pine upon the marsh lands is to plant it. The so-called "planting in converted peat" is by far the best method to be used under such circumstances. In this method sods, about a foot square and as thick as one can conveniently dig up with a spade, are taken up at suitable intervals (four or five feet) using a square pattern. These sods are laid on the ground, upside down, and are planted with two-year old nursery stock. These sods can be dug up and laid in place advantageously during the fall prior to planting, thereby expediting the actual planting operation in the spring time. Fall digging is not necessary, however, for planting in sod dug up just before planting has given good results. A man can dig up and put in place about 500 sods a day while a boy can plant about 1,000 plants per day.

If one, according to a widely used custom, digs up the sods in a continuous line and places them in the usual positions, there will be obtained four planting rows from each row of dug up sod (peat). Furthermore, if these dug up rows are laid out at right angles to the ditches, there will be established a very extensive system of shallow ditches in the surface of the marsh. During the first years after drainage, these shallow ditches are of much importance in carrying off the surface drainage.

One should always remember that one ought not to begin artificial seeding on drained marsh land too soon after drainage. Such measures should be delayed five or six years, until the swamp flora has died out and the surface of the marsh has begun to disintegrate (decay or crumble). In Sweden this delay is covered and described by the saying that "the peat should ripen first."

Planting on "converted peat," on the contrary, can often be successfully undertaken much sooner after drainage. On the best bog types, it can be undertaken immediately after drainage. Thus artificial planting offers certain distinct advantages over seeding or waiting for natural reproduction.

Touching the wood producing capacity of the drained peat lands, one can safely make the statement that it is very high on the better types of peat and generally much higher than on adjacent mineral soils. As an example some figures can be referred to which have been obtained

from the drained lands in the Forest School's Demonstration Forest, Bjurfors Kronopark, in Västmanlands province. Here, during recent years, the forest stands on part of the older drained lands have been under investigation. A report upon these investigations, prepared by Jagmastare E. Lundh, will soon be printed in "Skogsvårdsförenigens tidskrift." In this report, one will find examples of sedge bogs, drained 23 years ago, which are now covered by splendid, fully stocked stands of young mixed forest, originating from natural reproduction. These stands have a volume of about 570 cubic feet per acre and the annual growth has already reached 49.2 cubic feet which undoubtedly will be doubled within a few years. One area of mixed pine forest, about 50 years of age, located on very swampy land which, at the time it was drained, 1915, was growing at the rate of 41.4 cubic feet per acre, had increased its annual growth, in 1922, to 159.0 cubic feet per acre, *an increase of 117.6 cubic feet per acre per year* after only seven years of drainage. Considering the fact that the stumpage value of this timber amounts to about 5.3 cents per cubic foot, it will be seen that the increased growth brought about by drainage, which amounts, annually, to $6.23 per acre, almost exactly covers the cost of drainage, which, here, amounts to $6.61 per acre. Such drainage operations as the one just described are very profitable indeed. And it is a fact, generally holding true, that the drainage of the better swamp forests, in which the increased growth comes quite soon after drainage, proves financially profitable.

But, on the other hand, much drainage work has been carried out in Sweden where the increase in the growth does not yet and never can carry the interest charges upon the capital invested. And there are still other cases where the drainage has failed completely in bringing about any increase in growth. But all of these failures are due either to attempts to drain bogs of unsuitable types (such as "flark" and "holjemyrar") or to the silting up of the ditch system. These failures serve as a warning that a certain amount of judgment is required in deciding what types of swamp lands should be drained for forestry purposes, but in no way challenge the importance of drainage work as one of the most effective methods of increasing Sweden's forest production.

THE IMPORTANCE OF SEED SOURCE AND THE POSSIBILITIES OF FOREST TREE BREEDING

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There are two quite distinct methods by which the quality of forest trees can be controlled or modified. One is by transplanting climatic strains or varieties to other than the conditions under which they have evolved. This does not in any sense guarantee improvement, for very often the transplant proves poorly adapted to the new conditions, though sometimes superior to the native strain of the same species. The second method is by some form of selection of individuals within a strain to become the progenitors of a special, pure or nearly pure, type.

The improvement of forests by any means whatever is at present so urgent, and a creative method makes so great an appeal to the American type of mind, that it is desirable to direct the attention of foresters generally to the possibilities of tree breeding. It is believed that much progress might be made, without any special technical knowledge, if the marker of timber, for example, knew something of what modern science has proved regarding the heritable qualities of living organisms. Such knowledge could not fail to raise the question in any inquiring mind: Are we leaving the right kind of seed-trees?

By leaving seed-trees because they are unmerchantable for any reason other than accidental injury, are we not increasing the possibility of trees of poor quality in the future stand? Are we giving enough attention to the eradication of trees which show a weakness for disease and which may be transmitters of disease as well? In making thinnings do we always bear in mind that the trees which first become merchantable may be dominant because of inherited vigor, and that in cutting them we may not only be taking the best, but also reducing the quality of all future growth?

These questions suggest how the forester, with innumerable opportunities to practice "mass selection" may have the opportunity to breed forests *up* rather than *down*. While doubt may exist for some time as to what specific qualities are heritable, and under what circumstances, there certainly can be no mistake made in the general assumption that good breeds good and bad breeds bad.

The science of genetics has developed a considerable vocabulary of its own. For the sake of those unfamiliar with the literature, the following definitive paragraph is written to show the connections in which special words are used.

The *chromosomes,* which are microscopic bodies found in the nuclei of cells, are the material basis of heredity. Any chromosome or part thereof *(chromomere)* is considered to be a *determiner* of some *character* of the offspring or is said to be a *factor* in the *genotypic* composition of the individual. The elements which give the offspring its characters result from the *combination* of factors derived from the two parents when their *gametes* unite. If a chromosome from one parent, for example, determines blue eyes, and from the other parent brown eyes, one of these will predominate over the other and the progeny may be either brown or blue-eyed, but will, in turn, carry down to later generations both of the determiners. So long as any progeny carries antagonistic determiners, it is said to be *heterozygous* in its genotypic composition, and only when the parents are identical in every character can the offspring be strictly *homozygous,* and can all further offspring breed "true." *Phenotypic composition* refers to characters or appearances which are of outward form only and can not affect heredity. *Hybrids* result from the crossing of individuals differing appreciably in genotypic composition, or of more distantly related groups, such that decided differences in the several progeny are to be expected. *Mutations* are offspring showing decided *variation* from the known composition of either parent, and show the germinal character of their variation by transmitting their peculiar characters to later generations.

The basis of plant improvement or breeding lies in variation, and for this reason great interest attaches to the question of why and how variations occur. Variations are either germinal, that is, determined by factors within the germ substance, or they are somatic, that is, of the body itself. Germinal variations are inherited and occur either as combinations or mutations. Somatic variations or modifications are ordinarily considered as non-inherited. The results of recent investigations by geneticists and foresters indicate, however, that stimuli arising outside the germ cell can materially affect the mechanism of character inheritance.

These stimuli, according to Babcock and Clausen *(1)** affect character development in three ways:

* Italic figures in parenthesis refer to literature cited, page 50.

1. By modifying the development of inherited characters.
2. By conditioning the production of characters transmitted in the germ-plasm.
3. By causing germinal variations which result in the appearance of new heritable characters.

In the earlier work of forest seed collecting, it was taken for granted that any tree species was an organism with well-defined morphological and physiological characteristics, especially under conditions of normal development, and that the tree would bring the better qualities to its new home. This idea was in harmony with Weismann's[2] theory of non-inheritance of acquired characters. It was assumed that the development of certain strains with what might seem to be desirable acquired characteristics was really the direct result of natural selection and carrying down of the best combination of germinal elements. Although scientific evidence that external stimuli (mainly those of climate and soil) actually cause germinal variations is still rather meager, and although the idea that a change of culture or environment is effective in "breaking an established type" has little support, investigations so far with forest trees in various parts of the world lead to the conclusion that environment may have a definite effect upon the development of germ characters.

Williams[3] and Guyer[3] have shown that inheritance of acquired characters can take place not only in simpler plant organisms, but also in higher animals where the germ plasm and body tissue plasm are sharply differentiated. Jennings[3] states: "In spite of important differences of opinion among investigators, to the reviewers the facts in uniparental reproduction seem to point more toward the production of evolutionary change by the action of the environment on the germ plasm than by any of the other methods." Osborn *(14)* has pointed out that in evolution continuity and law prevails over the evidence of chance or of mutations, and that in the genesis of many characters there is a slow and prolonged direct evolution of the germ substance toward adaptive ends. Cytologists to some extent have come to believe that practically all plant tissues have protoplasmic connection between adjacent cells and that the body plasm can affect the germ plasm. This seems to be confirmed by physiology.

Stimuli affecting the germ plasm may be external or internal. MacDougal *(11)* in discussing plant variations concluded that mutations

[2] See *(1)*, page 480.
[3] See *(4)*, pages 24-33.

are due mainly to enzymatic or other action in neighboring cell masses. Spillman *(21)* regarded the germ plasm as something containing no structural elements, but having properties that predetermine the course of development and being influenced by two kinds of stimuli, environmental and physiological.

The external conditions directly responsible for the production of character in tree species are usually climate and soil. They give rise to the so-called "climatic varieties," the study of which has occupied practically all of the attention of forest geneticists, and to "soil varieties." Ceislar *(2)* supported the idea that hereditary characters are produced by climatic effect upon inner physiological activity. Oppermann *(15)* considered characters to be governed by inner factors, which were sometimes dormant and were developed by unfavorable climatic conditions, such as frost. Kerner[4] concluded from his studies that outer factors like climate and soil had an indirect influence upon growth and were harmoniously related with tree form. Nägeli asserted that races were the result of changes in the chemico-physiological constitution of plants, and that the formation of more or less constant varieties is not the work of outer, but of inner agencies.

Besides recognizing climatic varieties, Engler *(6)* also came to the conclusion that poor form, when it is the result of poor soil, is transmitted to the progeny. Willis and Hofmann *(26)* also recognized the effect of poor soil. They found, however, that external conditions (so far as their study carried them) have greater influence upon the progeny than inherited tendencies, and Preuss also found this true in certain instances.

In this connection, Schwappach stated that when races which have adapted themselves perfectly to the conditions of their habitat are transplanted in regions of decidedly different growing conditions, they either lose their excellent qualities of growth by becoming stunted, or misshapen, or they keep their original qualities and develop dangerous new qualities, such as a lack of resistance to insects and disease.

The study of climatic varieties has not been altogether academic in its purpose. It is true that the effort to transplant desirable varieties of any species into habitats different from that to which they have harmonized themselves has many times suffered failure, but it is also true that certain climatic strains have done exceedingly well, and in some cases, better than the local variety of the same species. The Riga va-

[4] Most of these unnumbered references will be found in Engler's reviews.

riety of Scotch pine *(P. sylvestris)*, native of the East Prussian Baltic region, possesses the valuable characteristic of adaptability to other climates, and its cultivation in preference to the local variety is recommended by Engler in middle and western Europe. The Japanese larch is recommended by Stephan *(22)* as superior to the European larch or any other tree species as a nurse tree on the poor soils of Schleswig-Holstein. Exotic oak species are known to produce better trees in Denmark than the local variety.

Practically all investigators in the genetics of forest trees are guarded in their assertions as to the inheritance of acquired characters. The subject is still conjectural. It may be supposed that where character inheritance is governed by external stimuli, and forest trees are highly heterozygous in their germinal structure, change is constantly taking place. Definite establishment of desirable characters can only be secured by striving toward pure lines in varieties and in homozygosity of structure. This phase of the problem has, however, hardly developed beyond the realm of thought as yet.

EXPERIMENTS IN EUROPE

Prior to 1870, when the French first became interested in the subject of the influence of environment and seed source upon the growth habits of forest trees, little or no investigative work had been done. In 1878, Reuss *(17)* started experiments with spruce in Bohemia and many years later published a comprehensive report of his investigations. The first steps toward formulating a definite working plan for a study of climatic varieties were made by the International Union of Forest Experiment Stations in 1900, and active work was initiated at various cooperating stations in 1906.

Engler and Kienitz *(9)* stand out perhaps most prominently among latter-day European foresters who have interested themselves in this problem. After studying the results of experiments by such men as Dengler, Kurdiani of Russia, Hickel, d'Alverny, and Pardé of France, Zederbauer of Austria, and Kienitz, Engler concluded that the formation of distinct varieties among species is due to climatic factors, soil factors, and inherent character factors such as peculiar growth forms and mutations, like late-sprouting pedunculate oak. If these forms do not occur in the progeny, it is due to the fact that our forest trees are highly complicated heterozygous products, the result of constant crossing.

Climatic modifications, it was pointed out by Engler, may be chiefly morphological and only of short duration, or physiological and retained for a long period, perhaps never disappearing.

Kienitz's deductions are based upon the results of experiments with Scotch pine and Norway spruce at Chorin, Germany. Plantations of these species started in 1907 comprised one unit of the international source-of-seed study proposed in 1900 and 1906. From the Scotch pine study, the general conclusions are:

1. To establish new stands in a pine region upon natural pine sites, the local variety should be employed in either natural, or artificial regeneration.

2. On no site are all trees of the same form, and although man in general is satisfied for his purposes with the forms as they have been developed by the trees in the course of generations, it is nevertheless a truism that in every stand certain forms satisfy the demands of management better than others. Since these forms are, to a certain degree, heritable, the stands must be so directed in their development that at maturity only such stems remain as express the desires of the management. Since it is economically impossible to remove all undesirable stems at the present time, provision must be made for cone collections only from older stands absolutely pure of strain.

3. The seed to be employed for introducing pine in new extensive regions must be selected with extreme caution, in order to secure only such varieties as give the greatest assurance of developing good forms upon the new site.

4. Seed stands of authentic origin should be established under governmental supervision. Improper seed source has discouraged the culture of pine in Switzerland, and has also led to discouraging results in Sweden, Livland and certain provinces of Russia.

Other contributions in this study are offered by Hauch *(8)* and Oppermann, *(15)* who studied the hereditary qualities of the "Renkbuchen," a climatic variety of beech growing in the Baltic region of Denmark; Tubeuf, Schwappach, Wibeck, *(25)* MacLarty, *(12)* Matthäi, *(13)* and Shirasawa *(19)* of Japan.

EXPERIMENTS IN THE UNITED STATES

Although the work done has been less extensive in this country than in Europe, the general results of experiments in the United States verify European conclusions that the proper choice of climatic varieties

is a vital factor in the success of forestation. From time to time, Sudworth, *(23)* Willis and Hofmann, *(26)* Eckbo, *(5)* and Kraebel *(10)* have discussed various aspects of the subject, principally in relation to climatic varieties. Experiments are being conducted in the northern and central Rockies, in Arizona and California, and the most recent reports on these have been made by Pearson *(16)* of the Southwestern Forest Experiment Station in Arizona, Wahlenberg *(24)* of the Northern Rocky Mountain Station, and Show *(20)* of California.

Pearson's experiments involved both a study of climatic varieties without reference to individual characters, and of individual trees of different characteristics within the same locality. In the latter tests, the effect of certain pathological conditions, spike-top, mistletoe, etc., upon seed production was studied. A continuation of work of this character, through the development of pure strains, only slightly or not at all susceptible to common tree diseases, would be pertinent.

In the Pikes Peak region, experiments have been and are being conducted at the Rocky Mountain Experiment Station with western yellow pine, lodgepole pine, Douglas fir and Engelmann spruce. The results secured with Western yellow pine point conclusively to the fact that seed obtained from points outside of the Central Rocky Mountain region, assuming roughly a radius of 250 miles, can not be considered desirable for use in the Pikes Peak region. Even with this limited range the development of climatic varieties, susceptible to comparatively minor changes in environment is apparent. The early results indicated that proximity to the point of sowing was a more desirable basis of selection than latitudinal or altitudinal distribution, although altitude is decidedly important.[5]

Lodgepole pine source-of-seed tests have indicated that seed from Montana and central and northern Wyoming should not be used in the Pikes Peak region. A compensating relationship was found to exist between latitude and altitude, which taken in connection with soil factors definitely influences the growth of this species outside its native habitat.

A study of winter-killing in lodgepole pine plantations during the very severe winter of 1922 and 1923, showed that 13 out of 14 lots from various Colorado and Wyoming seed sources had 90 per cent and upwards of their trees more or less injured. The one exception

[5] It is interesting to note that Kienitz in one of his experiments used timberline rather than elevation above sea-level as a basis for species in approximately the same latitudes, and established zones downward.

was from the Colorado National Forest and suffered only 79 per cent damage. Since this seed was obtained from sites along the front slope of the Rockies, more closely approaching the zerophytic conditions of the planting site than perhaps any of the other seed sources, the direct influence of environment upon the resistant characteristics of the trees and in the creation of distinct climatic types is evident.

The local source-of-seed studies indicate that for all practical purposes seed collections for any locality should be confined to local varieties, and that the extent of operations with a given variety over any given region should be governed by the uniformity of site and climatic conditions. No definite zones in Colorado can as yet be established as seed sources. For the present it is best to confine seed collection to localities relatively close to the point of use.

NEW STRAINS OR HYBRIDS SHOW POSSIBILITIES OF TREE BREEDING

A possible hybrid species of pine, resulting from a cross between long-leaf and loblolly pines in Louisiana has been described by Chapman *(3)*. This new tree is intermediate in taxonomic characters when compared with its parents, and evidently also in its growth performance. Whether this hybrid can be perpetuated naturally is problematical, for cross-fertilization by the original parent species results in a reversion to the parental type; but as Chapman points out, the idea of developing this new species by plant breeding methods is worth serious thought.

Near Dunkeld, Scotland, a bastard larch, named *Larix eurolepis* by Henry, has been produced by the natural crossing of Japanese larch *(L. leptolepis)* and the European species *(L. europeae)*. The hybrid, besides growing more rapidly in early life than either of the parents, is remarkably healthy. It is a curious fact that seeds of the Japanese tree alone produce hybrids; the neighboring trees of the native species reproducing entirely true to type.

Another instance showing the possibility of breeding experiments to develop new strains is the crossing of *Castanea pumila* (Virginia chincapin) with *Castanea crenata* (Japanese chestnut), which has produced a species exceptionally resistant to chestnut blight.[6]

[6] See *(1)*, page 410. Hartley *(7)* expresses doubt as to whether chestnut hybrids so far developed possess sufficient resistance to furnish a practical solution of the problem.

FUTURE ASPECTS OF THE PROBLEM

It has become more and more apparent that the problem of selection not only includes the proper geographical choice of seed source, but also the proper choice of individual mother trees as the initial step in the development of pure strains. Defects in growth and habit and certain undesirable morphological and physiological characteristics are governed by factors which must be considered as heritable and to be avoided if we are to develop forest stands to their maximum productive efficiency.

A large part of the work of agricultural research has dealt with the development of disease-resistant plant forms and this work can and must be applied to our forest research work as well. We have but to point to the enormous damage caused by mistletoe *(Razoumofskia)* on Western yellow pine, and to the fact that even in the worst infested areas isolated trees are free of the pest and might just as well be the progenitors of a new generation immune to the disease. An example of this kind may be found at the Fremont Laboratory of the Rocky Mountain Experiment Station, the apparently immune trees being at the same time of very much more desirable form for lumber than the diseased trees.

There is no need to enter into a long discussion of the economics of correct silvicultural practice; our chief aim is increased production, and this is necessarily associated with the development of pure races which assure continuity of desirable form, and the greatest possibilities of growth in their offspring. A misshapen or deformed tree whether by reason of inheritance or because of conditions of growth, should have no place in a stand. This naturally presupposes a greater development of forestry and lumbering practice than is economically possible at present, but the removal of undesirable stems should be accomplished as soon as possible, even though it means that entire stands must be replaced. As long as undesirable trees remain, cone collections should be limited or omitted, for regardless of the desirability of the mother tree the other parent may possess qualities to be avoided. Cone collections should be made in stands of pure strains wherever possible.

The "continuous" or Dauerwald form of forest management has become popular in certain parts of Germany within the last few years. Seitz, *(18)* in discussing the desirability of developing pure local strains of tree species capable of natural regeneration, states that the "continuous" forest idea will remain a myth without the development of pure

races. Energetic steps must be taken in the direction of individual selection in order to retain and produce the best mother trees.

What we miss at present, in view of the few cases of heredity of which we have knowledge, are real experiments establishing proof of individual offspring in pure lines. For example, it would be desirable to cultivate pure lines especially of individuals which fruit early in life, a characteristic of lodgepole pine. Only through individual selection and pure cultures through many generations, however, will the genotypic composition of species or individual trees, which constitutes the necessary foundation of any detailed genetic investigations, be established, and pure homozygous lines be made possible.

The development in the future of more intensive forestry, urged on by economic necessity, will demand the extension of forest breeding investigations. Unfortunately this work requires long periods of observation. The future of forestry and the future needs of civilization demand that a start be made soon.

In attacking the problem, investigations will consist primarily of observation and experimental breeding. For the present, observation will be the main feature because of the long periods involved and our very limited knowledge of the basic facts, namely the chromosome number and mechanisms which determine the heritable characters of any of our forest trees. This can be supplemented by experiments in breeding similar to those in agricultural research.

The oldest and most common method of plant improvement is selection. But it is also the least understood, in respect to many of the results obtained, and this is because of the lack of strict scientific control. The chief aim of selection is not to create but to isolate particular combinations of germinal factors. It is assumed, not without reason considering the experiments undertaken thus far, that the various differences in morphological structure, such as size and shape of crown and root system, also disease resistance, rapid growth, etc., are particular characters, the presence of which is dependent upon individually heritable elements of the genotype, modified in individuals of the same race by unequal environment.

The isolation of the genetic factors and their re-combination into the most desirable and favorable form for economic use is the problem of selection. The solution must necessarily begin with individual plants representing superior genotypes. In this way, dominant characters can be brought out, and recessive ones which may crop out can, if unde-

sirable, be more or less eliminated. Mutations resulting in unexplainable alterations of genetic factors often recessive and non-dominant, will, no doubt, occur in natural selection and can, if desirable, be preserved. Ignorant of the particular conditions causing mutations, we must be satisfied that some of the determining conditions are environmental and are controllable by man. MacDougal *(11)* pointed out that it is even possible to call out new species by the intervention of external agents during the critical period of a species' existence.

The important factor in selection is the kind of pollination. Self-fertilized plants are easily developed into pure lines, and improvement in these is an easy matter. But in the forest both cross and self pollination occur, and we can never be sure of the male parent in the production of seeds except in the very rare cases of stands of pure strain. This means, of course, that individual trees must be isolated, perhaps by screening, or that groups of desirable strains be isolated by cutting everything else. For years to come such procedure can be on an experimental basis only, but the challenge is there and any care now expended in marking and thinning operations to remove undesirable trees from stands is a definite step in the right direction.

The question arises whether it is desirable to leave old, deformed, spike-top, unmerchantable trees for seed trees in cutting operations. Pearson found that old, spike-top yellow pines produced good seed crops and may be left; but are we not failing to consider here the ultimate stand? We do not positively know as yet that the spike-top condition is heritable, but we do know that only seed-trees representing desirable strains can give us any assurance that the progeny will be of desirable and not conjectural character.

Selection alone has been found a powerful means of improving disease resistance in plants when used either in variety tests or in the improvement of single varieties. The diversity of races in respect to resistance is due either to morphological and anatomical, or to physiological characters. In any case, the development of disease-resistant strains is desirable, and will, no doubt, constitute a very important phase of future breeding work with forest trees.

Selection probably will find its greatest value in the isolation and propagation of individual trees producing the greatest volume at maturity. This character more than any other has been attributed to factors of site—climate and soil, especially the latter. That other characters are involved is evident from the diversity of sizes which are

found on any site where to all appearances the conditions affecting each tree are similar. As an index of what variations may be encountered in virgin stands in the Central Rocky Mountain region, the following figures are given. They are obtained from trees growing on uniformly average sites in the vicinity of the Fremont Experiment Station. The yellow pines occupied an open southern slope, the Douglas firs and limber pines a typical north slope characteristic of the region.

VARIATION OF TREES IN VIRGIN STANDS

Age Class	*No. of trees*	*Extremes in vol. cubic feet*	*Average vol. of selected trees cubic feet*
		(Douglas fir)	
120-130	6	0.54—18.77	5.74
130-140	14	3.52—25.80	13.70
140-150	7	8.52—36.66	19.89
240-260	8	31.05—62.01	43.18
		(Western yellow pine)	
120-130	6	2.64— 8.59	4.93
192-195	2	17.42—49.42	33.42
		(Limber pine)	
120-130	10	0.70—11.11	4.28

There is always the possibility that accident will influence the development of the individual tree, but the data given above are typical, as all foresters realize, and bespeak, in addition to character variations due to external conditions, germinal variations which we believe are heritable.

The question of hybridization will also receive attention where it may be desired to develop a better race for timber production, or to combat plant diseases to which certain species have shown themselves peculiarly susceptible. It is known, however, that hybrids in our forest trees are very limited in occurrence and are hard to perpetuate naturally, since cross pollination is constantly taking place, and further crossing usually results in a gradual loss of the vigor distinctive of the first generation. The principal idea in hybridization is to secure tangible results rather than to advance scientific knowledge by developing new and better combinations of existing germinal characteristics, but there is always danger of overdoing, because of ignorance of the fundamentals of genetics. Very often the desire is to create characters which are unknown in available phenotypes and for which there is no genetic representation in the species. Rather than fall into this error, it is

better to work with known characters along the lines of selection to create pure strains, or else to start with original mutations as indicators of the lines along which selection must work.

CONCLUSION

Growth habit is an heritable character or combination of characters and will predominate under certain environmental conditions up to a point where it clashes with changing environmental conditions. That it can modify itself within one generation, we do not know. At present we must consider trees as primarily unadaptive in an economic sense. We are offered the choice of morphological or physiological varieties inheriting certain peculiar characters, or of "standard varieties" modified by external conditions into "climatic varieties." In either case we can depend upon stability and true performance only as long as environmental conditions and the germ cell mechanism harmonize.

Our future work in this field seems clearly established. We have experimented with seed source and have paid little attention to individuality of forest trees. This is shown by the frequent striking differences between seed lots from the same geographical source. As long as one unknown quantity exists, our deductions can certainly not be conclusions. For that reason, it becomes necessary to start intensive breeding studies so that pure (homozygous) strains may be developed. Besides the immediate practical value which such strains may possess, they will serve as a basis of comparison for determining the trend of character development and domination under heterozygous conditions, and to find out if it is possible to further the development of distinct crosses or pure races in forest stands by natural means. We are only on the threshold of our knowledge and realize little of what methods our successors will be forced to apply in the development of future forests.

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GARDEN CITIES IN FOREST WILDS

By E. L. Chicanot

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Forest industries in Canada are characterized in their every phase by a permanency of aspect which is in marked contrast to similar activities in the United States and elsewhere. Canada's forests constitute one of her most magnificent and valuable resources, but although of such vast extent that anything like an accurate survey of them has been found impossible the Dominion has learnt from experience the futility of such terms as "illimitable" and "inexhaustible" as applied to them. It has come to be keenly and widely appreciated that, ruthlessly exploited, an inevitable end awaits them at some future period, however remote. Accordingly the interests which are developing them, twenty per cent of which are American, recognizing in them the continent's last timber resources, and one of the world's few remaining great forest stands, have adopted every means to preserve them and render them permanently fruitful. They have come to regard their operations as the harvesting of an annual crop rather than as a mining proposition tending towards inevitable exhaustion.

The result of this broad and visionary regard of forest operations has been that in all that pertains to the activities of the big pulp and paper companies, which are each year taking greater toll of Canada's forests, expanding their manufactures, and increasing their exports across the border and elsewhere, there is an impression of stability and fixture. They seem to be planted down in the northern fastnesses with the intention of remaining for all time. The atmosphere is one of permanence of establishment. There is nothing to suggest the mere location in a belt of rich timber to accomplish its denudation and then move on to other limits. Workers exude an air of assurance and content, as of being ensconced in comfortable niches of existence and free from worry over livelihoods for the rest of their days.

This is the more striking since it is naturally necessary for a newly organized company which has purchased large timber limits in the northern fastnesses to locate its plant in their very heart with a due regard to primary forestry operations, which means complete isolation from the big outside world, a severance from the conveniences and am-

enities of its civilization, a remoteness from railroad facilities until they can be extended, and altogether the encountering and combating of the most primal conditions. The pulp and paper company going into the northern woods is faced with the problem of carving a modern existence out of the untamed Canadian wilderness.

These large organizations, in initiating their operations, have had to move hundreds and at times thousands of employees into the forest fastnesses and, recruiting expert workers in developed and cultivated centers, offer them in exchange the rawest and most primitive of social surroundings. They have had to speedily provide accommodation for a substantial population, furnish it with the modern facilities and conveniences to which it had become accustomed, and develop for it something of that social life from which it was irretrievably cut off. Each has faced a tremendous task, with vast possibilities for a great work for humanity, and equal chances of bungling and merely adding to the continent's collection of squalid, drab, industrial towns.

But here again is that same aspect of permanency, with which is combined the element of beauty. There is nothing of the slipshod, the hastily thrown together, about these towns; nothing has been left to chance or done haphazardly. The pulp and paper towns found about the giant plants of Northern Canada are without apparent exception veritable garden cities, comparable in beauty of appearance, home surroundings, and living conditions, to the finest of residential suburbs which know nothing of industrial activity. There are actually no fairer or more habitable little burgs in Eastern Canada. Expense and thought have been lavished upon their conception and development. Frequently they have been planned and laid out by expert landscape artists. Management and employee population enthusiastically cooperate in maintaining this intrinsic beauty and in achieving a high standard of civic operation, with the result that it would be difficult to find in any numbers more contented and healthy people than dwell in these little towns surrounding the huge pulp and paper plants and are dependant upon them for livelihoods.

In these little microcosms in the wilderness a perfect and complete life exists, with all that makes for full and satisfied days, quite independent of that bigger world outside revolving about them, which they serve with one of its needs. They have uniformly that air of civic pride and satisfaction which strikes the casual visitor almost as forcibly as the beauty of surroundings and the geniality of the people. A truly

magnificent national and humane work has been accomplished by these companies in their efforts to maintain contented and healthy staffs, and in a survey of most of these towns it is difficult to discover the absence of any factor which might contribute to adornment or satisfaction.

The town of Iroquois Falls, in Northern Ontario, is a fine example of this intelligent foresight and expert planning. The Abitibi Pulp and Paper Company might be termed the real pioneer of the most northerly section of Ontario, having left the mining camps well behind in penetrating into the timber limits in the Abitibi lake district of the James Bay area. There it has bodily hewn a model town out of the virgin forest and set down modern civilization in the wilderness.

Entering the town on the little branch line which serves the community and industry, and which periodically bears away huge trains of paper, one sees the huge plant and its varied activity strictly confined to the one side of the track, with the smiling town stretching out on the other. There is a verdant park immediately opposite the station. Close by are several tennis courts; beyond lies a fine golf course. Streets radiate from the park with rows of semi-detached houses in a pleasing variety of styles of architecture. Each has its well-kept lawn and flower garden in front and its vegetable garden in the rear. In the summer the town appears to be one mass of flowers and a veritable riot of color.

It lacks nothing in the way of modern convenience, social life and diversion. The Company owns the townsite, has built the houses, and lets these to the employees on terms so reasonable that there is no record of one of them having made application to purchase his home. There is a large hotel, completely appointed in every respect, for unmarried employees, which has become the center of the younger set's social activities. The town has a large Y. M. C. A., a skating arena, and recreation grounds of every kind. Every night of the year there is some social event to occupy the population. The Company encourages the formation of literary, debating, and dramatic societies, and educational groups of various natures, and periodically brings in lecturers and other entertainers. Altogether the people of Iroquois Falls are left with scarcely a thing to wish for. Fifty houses were built in the course of the present year, bringing the total number up to two hundred and eighty-five.

When Price Brothers and Company, Ltd., first projected the paper mills at Kenogami in Ontario about fifteen years ago, the question of

housing its employees was one which occasioned considerable anxious thought. The site acquired for the mill was raw farm land, with nothing but the primitive wilderness about it and there was no town within any reasonable distance of it. It was, therefore, decided to lay out a village, and streets and avenues were defined, sewerage and water systems established, and an electric lighting service installed. A number of houses suitable for workers, several of better construction for members of the staff, and a large brick house for the use of the manager and directors were speedily in course of erection and, when the mill opened, in readiness. Two large boarding houses were also built and occupied during the construction period as well as a handsome brick building, known as Staff House, for salaried members of the staff. The addition of two churches—a Roman Catholic and Anglican—and necessary school accommodation formed the nucleus of the present flourishing town of Kenogami.

Kenogami today is an example of civic perfection, receiving its charter as a town in 1922, splendidly laid out with wide streets, tree-lined boulevards and green parks. There are about a dozen stores, several restaurants, a laundry and an hospital erected by the Company. The original forty-five dwellings have expanded to one hundred and thirty, owned by the Company and tenanted solely by employees and their families. In addition, the Company adopted from the first the policy of selling to their employees and others building lots on very easy terms and furnishing the purchasers, also under easy conditions, with the necessary lumber for house erection. In this way many employees have become their own landlords with the result that there are now approximately four hundred dwellings in the town, all built on land acquired by the Company.

This very complete microcosm has its football and baseball fields, tennis courts, curling rink and skating rink. In 1918 the Company opened a fine club house with large auditorium for moving picture shows and other entertainments, a gymnasium, bowling alleys, billiard room, reading room and shower baths. With the assistance of the Company a fine schoolhouse for English speaking children has been built, whilst the French speaking have two large schools capable of accommodating eight hundred children, and a convent. Whilst all these various phases have been lately handed over to the employee population, the financing is necessarily done by the Company and the two combine to maintain a little town of which any area might be proud.

Another model town in the very heart of the Northern wilderness is Kipawa which the Riordan Company has developed with the object of providing comfortable, healthy and satisfying living conditions for its employees. The site of the town is ideal, being situated on an abrupt slope overlooking beautiful Lake Temiskaming. The town was carefully planned, laid out and sub-divided, and streets, building lots, parks and playgrounds mapped out, some of which have been developed whilst others are awaiting the expansion of the town. There is a fine water system, sewerage, electric lines—which provide light and power for cooking as well as street lighting—and schools and churches.

The Company has to date constructed 125 fully modern houses which are divided into three classes—mechanics, mechanic helpers and labor. Due to climatic conditions homes have been provided which will keep the fuel bill at a minimum. Generally they are of frame construction, brick veneered, on rubble masonry foundations with full basement containing hot air furnaces. The first type of house is 625 feet square and contains six rooms and bath, electric light, hardwood floors, interior trim B. C. fir, stained and varnished, walls painted natural tones. The second type has a ground area of 600 feet and the third 600 feet, being otherwise largely similar in equipment and finish. Unmarried employees are provided with comfortable living quarters by means of dormitories and a fully equipped restaurant.

Education, which is kept at a high standard, is provided free by the Company for employees' children. Every manner of sport and amusement is fostered by the Company, in addition to which Nature provides citizens with the most superb fishing, excellent shooting and boating, and all manner of outdoor sports. Owing to the isolation of the locality, the Company, through its farm, provides the population with fresh farm produce, and through its retail store, furnishes every need of the community at very moderate prices. Competitive merchants are permitted to do business in the town and in every other way it is attempted to avoid any suggestion of paternalism towards employees. They really own the town and run it under the Company's financing.

One of the finest and biggest achievements in this line among Canadian forestry companies is the town of Espanola, which is as pretty as its name, owned and controlled by the Spanish River Pulp and Paper Company, and situated on the banks of the Spanish River in Ontario. Twenty-five years ago there was absolutely no settlement where today

a flourishing community of about 4,000 people depends on the pulp and paper mills. The Company owns one square mile of townsite and approximately 110 acres of this have been built up with various types of houses, practically all owned by the Company. The houses range from four to seven rooms except for a few larger ones occupied by superintendents and heads of departments, and all are equipped with modern conveniences. Roadways are wide with cement sidewalks; there are two fine schools—public and separate—and three churches. The Company also built a fine community hall for the use of employees, which is rented to local societies and organizations for concerts, dances, etc., at a nominal rental. Other facilities are a curling rink, athletic field, and gymnasium.

A hotel built and operated by the Company primarily for the employees but also accommodating transients, is recognized as being one of the finest in the province, outside Toronto, and is being more extensively patronized each year by tourists on hunting and fishing expeditions. There are four boarding houses of 21 rooms each, to care for unmarried employees. The town is as adequately equipped as the average burg, with fine mercantile buildings, a Company general store, bank, barber shop and poolroom, drug store, ice cream parlor, clothing stores, motion picture house, etc.

Many of the Company's employees reside in a suburb known as Frenchtown, just beyond the limits of the Company's property and for their convenience the Company has extended the electric light and water service there at the same rates as prevail in the Company's town. The village not being incorporated, the various public utilities are operated by the Company which has also established an emergency hospital there with a nurse in charge. The Company also maintains a community nurse who makes a regular inspection of children in schools and in their homes, whilst there is a nurse continually on duty at the plant and a local dentist available at all times. A handsome library of 5,000 volumes has been established for the use of the employees.

Espanola is believed to be the largest and most popular town in Canada controlled solely by a Company. It is completely self-existing and is in every respect systematically planned and laid out and maintained with a high regard for beauty, orderliness and satisfactory living conditions.

There are few towns in Canada, or within the limits of latitude and climate on the continent, more appealing at first sight to the visitor,

than Grand'Mere, Quebec, situated on the St. Maurice River, in one of the most picturesque sections of the Province. Yet before the Laurentide Company purchased timber limits in the area and set about the production of paper, this was an absolute wilderness, grandly beautiful in its majestic way, but uninhabitable. Today Grand'Mere is a thriving and prosperous town of 7,600 inhabitants. It has four churches, a convent and boys' High School, three banks and some allied lumber industries. It has a vast electrical development exporting power. It is an important asset in Quebec industrial prosperity.

But it is more than this. It is a town of most engaging beauty. In summer one carries away an impression of large green spaces and varitinted spots and of a tranquil, browsing atmosphere. Parks and boulevards are numerous. Masses of blooms strike the vision on every side. There are magnificent golf links, tennis courts and large playing fields. Streets are systematic, clean and orderly. The semi-detached houses are of quaint architecture, combining to a harmonizing impression. The town seems to be as far removed as possible from any trace of industrial activity, and one would rather imagine it to be the center of retired people whose sole desire was peace and tranquility.

The Laurentide Company is entirely responsible for Grand'Mere, for its planning, laying-out and development. Its citizens are the employees of the huge mills which are continually turning out their forest product and sending it across to appear in the newspapers of a hundred United States cities and towns. It is the home of contented and satisfied citizens who are spending satisfying lives in the very best of modern conditions, though remote from what the world calls civilization.

The town of Kapuskasing, Ontario, where the Spruce Falls Company has located is due in time, through the efforts of the Company, to be a rival in beauty and utility to longer established pulp and paper towns, and well illustrates the tendency towards permanency on the part of new companies going into the northern Canadian field. To date the Company on its new townsite has built more than 100 houses, each having a concrete foundation, a cellar, furnace, hot and cold water, bath and electric light. They are all detached or semi-detached and are rented to employees for $17 or $18 per month. Local improvements, such as sewer and water mains, have been provided along all streets which are occupied by houses, and plans which have been made for the next few years include considerable attention to parks, lawns, etc. The aim of the Company is to develop a garden city, comparable to those

of other Canadian Companies which have been engaged for a longer period in the exploitation of Canada's forests.

An equal desire to improve conditions, to develop contented employees, and to surround their lives with beauty and healthful recreation, is evidenced even where towns have existed before a large Company went in to manufacture pulp or paper, and where it was not necessary to go to the same elaborate lengths to provide accommodation for employees. Thus the Brown Corporation had nothing to do with the establishment of La Tuque in Quebec, and little in its actual development, but it is a brighter town with greater facilities for the Company's entrance. It established a school for the English speaking population, assisted in the establishment of the Protestant church, and built and maintains a boarding house capable of housing and boarding 30 single men on the staff. It further established a Community Club for employees, and other citizens, with gymnasium, swimming pool, bowling alleys, billiard room, ball room, banquet hall and sleeping rooms. The effect of the Company's presence is seen in the maintenance of orderliness and the preservation of natural beauty.

In the foregoing survey will be found the names of most of the large organizations which are exploiting Canadian forests to provide the newspapers of the United States. It is a remarkable fact that they would seem to have been all actuated by the same high principles in carrying out the necessary civic developments about their industrial activities. It has apparently been a matter of pride and friendly rivalry that each town shall be a Garden City and surpass all others. The result is that taken together they are among the fairest of which Canada can boast, developed ofttimes in the face of the greatest difficulties.

The reward to the Companies has been commensurate. In each there is a strong and healthy civic pride, developed of thoughtful material provision and beauty of surrounding. These little burgs, carved bodily out of the untamed wilderness, harbor populations who are contented citizens and most satisfactory employees, living very satisfied lives, complete in every respect, with no need or desire to look into the world beyond which, without comprehension, may be inclined to pity their remoteness. Each is a very complete little civilization set down in the heart of the forest fastnesses.

A NEW METHOD FOR LAYING OFF RECTANGULAR SAMPLE PLOTS

By Adrian C. Thrupp

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This method was devised by the writer at a time when all the staff compasses were retired on the sick list. There was no cross staff-head available, and the use of the transit, the most accurate of all methods, was out of the question on account of the time that would be taken for each set-up. In addition the transit is difficult to handle in places where no cutting is allowed as is the case in control plots.

The equipment required comprises a plane table or traverse board, cross-section paper, an ordinary alidade, not less than ten inches long, if accuracy is desired, and the usual picket and steel tape. If greater accuracy is required or plots of large size are to be established, an alidade with a longer base will be used. Finally, with a telescopic alidade nearly the same degree of accuracy can be obtained as prevails with the transit, but with much greater speed.

The procedure is as follows: the cross-section paper is pinned on the plane table, which is then set up at A (see figure) over the station that is intended to be one corner of the plot. The alidade is then placed in position (1) along the line of the cross-section paper which is judged to be vertically over the corner post A. The whole board is then oriented by the alidade sights on the picket P$_{II}$, and clamped. The side A-B is next chained out and the corner post B established.

The next step is to move the alidade to position (2), at right angles to the side A-B and vertically over corner post A, the angle being determined by the cross lines of the cross-section paper. The picket is lined in at P$_{I}$, the side A-D chained out to the necessary distance, and the corner post D established, provisionally.

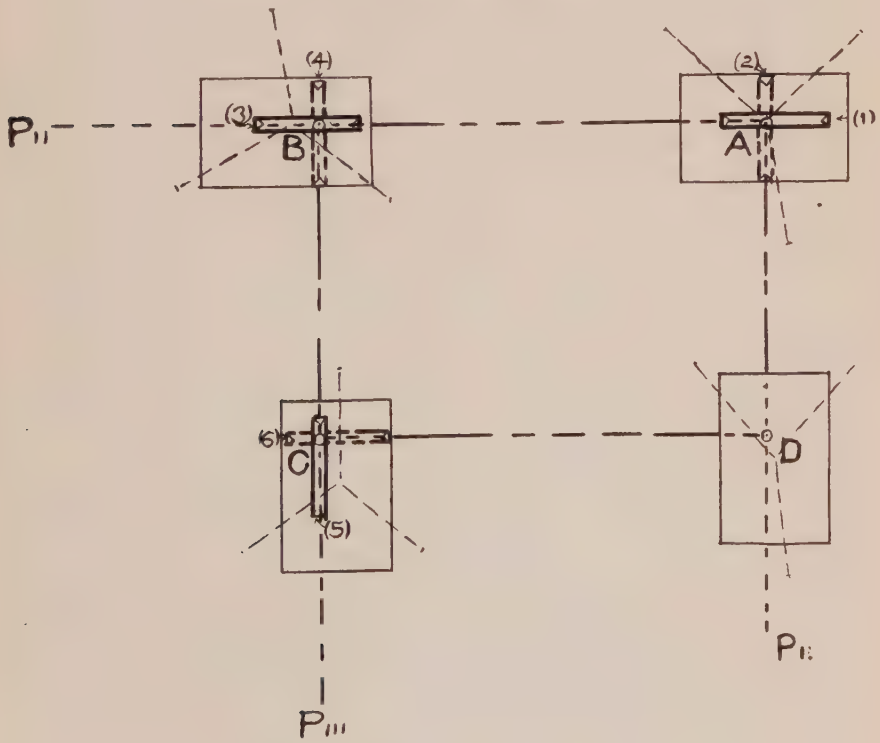
The plane table is transferred to corner B, and, with the alidade in position (3), aligned on corner post A, and clamped. The alidade is then moved to position (4), turning a right angle by means of the cross-section paper, the line B-C run out in the same manner as A-D, and corner post C established.

If no very great accuracy is required, the rest of the work consists in chaining the line C-D to check up; but the plane table can be set up over corner post C, oriented on corner post B, and the line C-D

run out and measured. The exact error of closure will then be found. It is not necessary to set up at corner D at all unless the topography is such that it is easier to sight from corner post D to corner post A than the reverse.

The method has been used chiefly for laying off rectangular plots with an area of an acre or some fraction thereof. In square chain plots the maximum error of closure has been two-fifths of a link, that is, a percentic error of not over one-fifth of one per cent, (1 in 500); in one quarter acre plots rarely over half a link. In fact the error will mostly be due to chainage and to neglect to see that the alidade is vertically over the corner post.

METHOD OF LAYING OFF SAMPLE PLOT



One special advantage of the system is that a latitude of an inch or two either way can be allowed with the alidade on the cross-section paper, in order to pass obstacles, without endangering the accuracy.

Even should there be a tree on the line of sight which it is necessary to retain in the stand for the purposes of the experiment, it is usually possible to sight past it, without having to make another set-up of the plane table, by simply moving the alidade a few inches to the right or left and making a corresponding correction when the next corner is located.

It is considered that this method is worthy of trial and use in all instances where it is convenient to employ a plane table. Its advantages over the cross staff-head are as follows:

1. Owing to the longer distance between the sights a much greater precision is obtainable without any extra expenditure of time. It is therefore more accurate.

2. There is no diminution of accuracy should the ground be rocky, and it can be carried on when the soil is frozen if necessary.

3. The method can readily be combined with ordinary plane table work when the plot is irregular, for greater ease in calculating the area; and it is of special value when it is desired that one or more of the angles be right angles.

Great advantage is gained by this method over the usual staff compass work, except in cases where the plots are to be laid out during the course of a strip survey—when the cross staff-head is the better instrument. With the plane table and alidade there is no tedious waiting for the needle to stop oscillating after each adjustment, and no worry about attraction, either local or from other equipment, rendering the results inaccurate. The only way that a staff compass could compete with it in accuracy and speed would be to have it mounted on a tripod, and equipped with a slow-motion screw adjustment, an instrument that the writer has not seen described anywhere.

The plane table-alidade method described here has an additional advantage in that no equipment is required which is not always at the disposal of anyone engaged in forest surveying or research work. It is more efficient and gives a much greater accuracy for the same outlay of time and trouble than any of the other methods generally in use and it can be employed where formerly the transit was used, except in such cases where the requirements of the work are such that exceptional accuracy is necessary.

REVIEWS

"Forest management in Latvia." (Lettlands Forstwirtschaft). By Fr. Kugler, Zeitschr. Forst.—und Jagdw. Vol. 55, 1923. pp. 147-153.

The Lettish forests are composed of the original Russian crown forests of approximately 988,400 acres, the nationalized, formerly private and entailed, forests and estates of the nobility comprising 2,779,875 acres, city forests of 61,775 acres, and the forests owned in small parcels by the farmers, which must comprise 74,130 acres, but of which little is known. Only the first two classes are considered here.

About 15% of the total area is at present unproductive, because of fire, destructive lumbering and military activity. The stocked area of the old crown forests is composed of 80% coniferous stands, which frequently have a hardwood mixture of birch, aspen and alder. Approximately 60% of the coniferous forest is young (below 80 years) and 40% old (80-150 years), and is for the greater part composed of normally closed stands. The nationalized forests contain very few old closed stands. Old stands have for the most part been opened under a rather common unregulated selection cutting, and spruce has pushed itself from an understory to a competitor in the upper crown layer. 78% of the forested area contains principally conifers, of which 75% are young, and 25% over 80 years. Broadleaf stands in the original crown and in the nationalized forests, being cut for fuel wood under a short rotation, are 60% under 40 years of age, and the balance mostly less than 80 years. Aspen and birch are easily the chief species, some of the former being 31 inches in breast-high diameter.

An estimate of yield only is possible. The average annual growth of commercial wood over 2.75 inches is about 35.7 cu. ft. per acre, and yields in round figures 110,875,000 cu. ft. of commercial timber. In 1921, the state forests yielded 38,842,000 cu. ft. of lumber and 63,559,000 cu. ft. of salable fuel, valued at 266,000,000 Lettish rubles.

The system of management is very extensive. Latvia is divided into about 80 forest ranges, which are divided into 350 forest districts, 3,800 forest guards provide the protective force. In comparison to the normal pre-war personnel on the crown forests, the present force of administrative officers is 25% less, and the protective organization 55%. Even before the war the personnel was insufficient. The education along forestry lines of the administrative officers is meagre, only 20% having any forestry training at all. In the matter of forest

regulation, conditions are unfavorable. The former crown forests were managed under a definite regulatory system, but the plans miscarried to a great extent during the war. However, the present condition and stand is known, and the annual yield determined. Of the former private forests, only one-half were ever regulated, and for these most of the plans are missing. Very often even the forest charts are missing and much time will elapse before all the forests are measured and regulated. In the old crown forests, the clear-cut system prevailed for a long time; only during a few years prior to the war were old trees removed under a selection cutting. Reproduction was secured naturally from the side or by seed trees or artificially. Most of the pre-war reproduction was successful, which is not at all strange, when considering the excellent conditions for growth. However, the area covered by hardwoods has increased under clear-cutting. In many localities the evil effects of strip cuttings are plainly visible in soil retrogression and hard-pan formation. The ordinary system of cuttings was by progressive strips or compartments from the east, although cuttings from other directions often gave better results. The destructive influence of one-sided regulation is easily visible. The "storm" factor periodically upset the regular plans in storm-exposed sections. Light thinnings in the understory to remove the hardwoods were occasionally made, though there exists a general ignorance of the value and mechanism of planned thinnings in the main stand. It is apparent, that the principles of the continuous forest, namely soil protection, care of the stand, mixed forest, natural regeneration and the resultant augmentation of increment and yield, would find a fertile field for operation over a large territory, since growing conditions are excellent, and any kind of radical attack upon the forest in the form of clear-cutting and fire has disastrous effects. At present, though, the axe has the upper hand.

As regards forest protection, conditions are much different from those in Germany. Destructive forest insects do little damage. The nun-moth has made itself noticeable in the southern part of Courland only. The actually dangerous insects are *Hylesinus piniperda* and *minor,* and *Tomicus typographus* in the first line and *T. chalcographus,* and *Hylobius abietis* in lesser degree. Of the fungus diseases, the needle shedding disease (*Lophodermium pinastri Schrad.*) is rare, and *Hallimasch* occurs only occasionally. *Polyporus annosus, Trametes pini* and *Peridermium pini* are extremely prevalent, and very little effort is

made to combat them. *Pezizza Willkomii, Peridermium strobi* and *Mellampsorella caryophyllacearum* prevent the planting of larch, Weymouth pine and silver fir in many places. Systematic care and regular management would keep all of these destructive agents under control. Fire has been the worst enemy of the forest to date—in the summer of 1922, 14,800 acres of forests were destroyed by this agent. Telephone lines, lookout towers, etc., are missing and the burning of wood by locomotives without precautionary devices is the cause of many fires being started. Fire prevention funds are very scarce.

Agrarianism, common or state ownership, under which 90% of the total forest area is controlled, instead of providing the means and incentive of a uniform system of forest control and management, finds expression only in a political, selfish way. Personal covetousness is dividing the forest into small units, which nullifiies any attempts at management. On top of this, the forests are being unnecessarily cut-over for fuel to assist industry injured by the war, and this wasting of the forest capital is supported by law. Furthermore, the state has authorized the realization of some 24,700 acres of mature forest stands within the next three years in addition to the established cut based on yield. This additional acreage includes stands remaining in the old crown forests, and their cutting at the present time will result in material reduction of yield in the future, which constitutes an attack upon the forest capital which can not be justified from a forest politic standpoint.

J. Roeser, Jr.

Census of Manufactures: 1923. Department of Commerce—Bureau of Census—The Principal Lumber Industries, Lumber and Timber Products, Planing Mills, and Wooden Packing Boxes.

This bulletin, as its somewhat comprehensive title implies, contains all of the data usually found in such publications concerning the lumber manufactured by states, species, classes of mills, etc.

There is nothing particularly striking in these figures, unless it is that the South still leads the West in production, in spite of Washington's tremendous individual lead; that the southern pine output surpasses that of Douglas fir by over 50 per cent; and that Minnesota leads in the production of cottonwood.

All the information about wage earners in logging camps and sawmills, when they work and how much; how much horse-power was

used and what produced it; the value of products by states, species and other combinations, is all there.

The same data are available for veneer and cooperage. These are valuable data, but all such material is almost necessarily more or less dry. That, however, applies only to the first part of the report. Under a heading, "Distribution and Consumption of Lumber" there is some brand new data of absorbing interest.

A comprehensive table traces the whole annual cut of some 34½ billion feet from the source of manufacture to the point of consumption. The statistics are given both by states and by regions, and the effect is striking.

It brings out in a remarkable way the competition between producing regions. It shows that Douglas fir now penetrates to every state in the Union. But that does not mean monopoly. Southern pine reaches every state, including Washington and Oregon, with the single exception of Nevada.

Illinois, Iowa, Indiana, Maine, Michigan, New Jersey, New York, Ohio, Pennsylvania, Tennessee and Wisconsin all get lumber from every producing district in the country except the prairies, which produce such a small amount that it probably would not go round.

The position of the Lake States is probably the most striking example of regional decadence. Michigan, Wisconsin and Minnesota led production in the whole country thirty years ago; today Michigan uses as much from the South as she does from the Lake States, and Minnesota uses twice as much from the Pacific Coast as she does from her own region.

Five of the producing regions of the country are importing and five exporting.

Such figures as these are well worth while, and the collection of further data along this line might do much to solve our problems in forest economics.

E. G. Cheyney

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Compiled by Helen E. Stockbridge, Librarian, U. S. Forest Service

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NOTES

No Change in Subscription Price of the Journal

No expansion of the Journal is to take place this year for lack of funds. The Journal returns to its former eight issues per year. There will be, therefore, no increase in subscription price.

Bolling Arthur Johnson

The death of Bolling Arthur Johnson, on December 19, removed from the ranks of the editors of timber trade press a unique figure. As editor of the Lumber World Review, he had a keen appreciation of the rapidly changing old order of things in the lumber industry. He appreciated forestry as the coming force that is to lead the lumber industry to a new basis. He was generous, therefore, in giving space in his paper to articles on forestry. While retaining always an idependent spirit of criticism to many forest proposals, he was fearless in pointing to the lumbermen their mistakes and urged them on toward forest practice.

A great biblical student, a facile writer, full of rare humor and wit, he knew how to lash his opponents and praise his friends. On the whole, he was big-hearted, generous, fair, and a true friend of forestry and of foresters.

He was also the founder of the Concatenated Order of Hoo-Hoo and it was also largely through his efforts that in this Order a new progressive spirit manifested itself in the formation of a movement known as the Friends of the Forest. Since 1919 he was an Associate Member of the Society of American Foresters. Foresters will miss his stimulating and friendly spirit and the country a forest missionary within the ranks of the lumber industry.

Results of a County-Wide Tree Planting Program

The follow-up work on the demonstration farmstead windbreak plantings in Story County, Iowa, is yielding some valuable information to people of the county. These plantings were started in the spring of 1924 in co-operation with the Farm Bureau and Forestry Extension Service. They were placed, one in a township, in accordance with the county wide plan for establishment of tree growing demonstrations, and Story County was the first county in the State to carry on such a program.

The average survival of the various species after the second growing season is as follows:

White pine, 89%; Norway spruce, 90%; Douglas fir, 80%; White cedar, 94%; Catalpa, 98%; Ash, 99%; Poplar, 70%; Mulberry, 92%.

These figures are low because they include one planting of considerable size in which no replacement work was done last spring and one planting where stock broke through the fence and destroyed most of the trees in part of the planting. With these eliminated the percentages are: White pine, 93%; Norway spruce, 93%; Douglas fir, 82%; White cedar, 100%.

The trees spent the first season becoming established and the growth last year was not great. During the past summer, however, the growth ranged from 3 to 12 and 18 inches for evergreens, and from 18 to 48 inches for hardwood species.

Last winter and dry weather during the spring and summer were particularly hard on trees, even large well established ones, so that with an average growing season there would have been nearly a complete stand in all plantings. There are several of the plantings now which have full stands and will probably require replacement of only a few trees next year. With one more year's replacements all plantings will no doubt contain full stands by the end of the third growing season. The matter of diligent replacement of failures in a planting of this kind during the earliest years of its life is one of the essentials in securing a full stand, and a full stand is of primary importance in the ultimate efficiency and uniformity of the windbreak.

The response of the trees to care is clearly demonstrated. Those plantings in which weeds and grass have been kept out best show uniformly the best growth and most vigorous trees. The past two years' experience also indicates that a good method for accomplishing this and one which minimizes the labor necessary is heavy mulching of the entire area or the planting of a crop between tree rows to shade out weeds and grass. Two of the most successful crops have been corn and pumpkin or squash. Where corn was used, none was planted in the tree rows themselves, and where pumpkins or squashes were used, it was necessary to go through the planting several times during the season and pull the runners off the trees to keep them from bending the trees over. Where a heavy mulch is placed over the entire area, it is essential to keep the mulch intact during the summer and possibly partially to renew thin places in the fall because the tendency for the tree roots is to develop closer to the surface and if the mulch is removed later the roots are subjected to greater drying out than before.

The Story County plantings are attracting considerable interest and will increase in value as demonstrations with each year's growth.

Wood Waste Attacked

That a concerted and continuous drive will be made in New York State against the waste of wood in logging, lumber manufacture, and in the various uses of finished wood products, was assured by the appointment of a committee to make effective the results of the New York State Wood Utilization Conference held at the New York State College of Forestry, Syracuse University, November 12.

This conference, the first of its kind in New York, and an outgrowth of the National Wood Utilization Conference in Washington last year, was attended by representatives of 30 state and national organizations. The chairman of the permanent committee is George W. Sisson, Jr., Racquette River Paper Company, Potsdam, New York; vice-chairman is W. F. Bancker, American Forest Products Corporation, 292 Madison Ave., New York City; H. B. Coho, New York Lumber Trade Association; Paul S. Collier, Northeastern Retail Lumber Dealers' Association, Rochester, N. Y.; M. B. Rappleye, Builders' Exchange, Rochester, N. Y.; Horace F. Taylor, Taylor & Crate, Buffalo, N. Y.; Walter Buehler, The Barrett Company, 40 Rector St., New York City; R. V. Crowley, New York Central R. R., Utica, N. Y.; G. R. Blount, The Blount Lumber Company, Lacona, New York; S. J. Lowell, Past Master, New York State Grange, Fredonia, New York; Nelson C. Brown, New York State College of Forestry, Syracuse, N. Y., and A. B. Recknagel, secretary, Empire State Forest Products Association, Albany, New York.

Conservative estimates show that by methods now known and available the drain upon the forests can be reduced two-ninths, which nearly equals the present growth of timber over our entire forest area. It has also been estimated that additional savings may be expected in the future as great as those we already know how to apply and that the two would ultimately make possible savings in the use of wood equal to approximately two billion cubic feet per year or nearly one-half of the present drain upon the forest. The importance of waste prevention is not only indicated by these figures but also by the fact that it is the only means of relieving quickly the present shortage of timber and lessening the severity of the impending timber famine now being threatened through forest destruction in the United States.

The conference followed a two-day small sawmill demonstration. It was opened by the chairman, George W. Sisson, Jr., president of

the Empire State Forest Products Association, which with the College of Forestry sponsored the meeting. Frederick V. Bruns, president of the Chamber of Commerce, welcomed the guests on the part of Syracuse, Chancellor Charles W. Flint spoke for the University and Dean Franklin Moon for the College.

Lively interest was added to the meeting by exhibits of The Forest Products Laboratory at Madison, Wisconsin, under the direction of W. W. Weber; the California White and Sugar Pine Manufacturers' Association; The White Pine Manufacturers' Association; The Pacific Spruce Corporation of Oregon and the Maloney Lumber Company, Syracuse, New York.

The complete proceedings are to be published soon and can be obtained upon application to the Empire State Forest Products Association, 316 Journal Building, Albany, N. Y. They include the addresses by Aldo Leopold, Nelson Brown, Wm. A. Babbitt, Axel Oxholm, Arthur T. Upson, C. Marshall Taylor, F. V. Dunham, Shirley W. Allen, and Congressman John D. Clarke.

National Council on Outdoor Recreation

The President's Committee on Outdoor Recreation has extended an invitation to the National Conference on Outdoor Recreation and to the members of its General Council to meet with the Committee in Washington, January 20 and 21.

This will be the first meeting of the full Conference since its initial organization in May, 1924, and the second meeting of the General Council, on which the Society of American Foresters is represented. The participation of the President's Committee signifies a conference of unusual importance. The principal objects of the meeting are to consider Federal and State responsibilities in outdoor recreation; a national program for 1926 for the endorsement of the President's Committee; progress reports on Conference Surveys and Committees. Officers will be elected for the new year.

An exceptional opportunity is afforded through the medium of the President's Committee to place before this body for consideration your studied conclusions on outdoor recreation and the conservation of our wild life resources. It is hoped your organization will send a strong delegation. In accordance with the by-laws the number of delegates is not limited although each organization is entitled to but one vote. A cordial invitation, too, is extended to all delegates and visitors who attended the initial conference. S. T. Dana.

SOCIETY AFFAIRS

THE TALE OF TWO LETTERS

Letter One

Missoula, Mont., Dec. 8, 1925

To the President of the Society:

Reference is made to your report of the recommendations of the Executive Council dated November 5, 1925:

You are to be commended on the very strong introduction you made as a brief of the general ideas of the Executive Council. I am sorry indeed that 70% of the members of the Society were not sufficiently interested to even reply to the statement of June 10. I assume this to be about the relative proportion of the members who usually fail to answer either your official communications or those of the Executive Council. This is in itself an indication of dry rot. We have been living too much on the efforts of others. The Society was in its hey-day during the Rooseveltan period, when, due to the efforts of Roosevelt, of Pinchot and to no small extent, our own Senator Dixon, the Forestry movement was put over in the United States—by these men alone. The power, the personality and the political acumen of this trio left little for the Society to do during those strenuous days.

Conditions are now reversed. We do not possess a leader, barring Greeley. We do not have those powerful friends behind us, to do our work, and yet forestry is embarking upon its most critical period of reconstruction. The National Forests are thoroughly established. State and private forestry is feeling its way. Constructive forestry legislation in and amongst the states is yet to come. I leave out of consideration Pennsylvania, New York and some of the other Eastern communities. The Society is willing in spirit that the Society get behind these movements, but when it comes to a question of paying for the advancement of our own professional interest out of our own pocketbooks—"no."

To expect the Executive Council or the president of the Society to donate all of their time or all of his time is foolish in the extreme. Yet the negative vote on the increase in dues means that that is exactly what the Society expects. I think the first thing the Society has to do is to sell forestry to its own members—to fix in their minds the fact that everything that advances forestry, whether it be Federal, state or private, means a more desirable profession and with an increase in desirability, a greater salary and that the increase in dues is nothing

more or less than the payment of a premium on an insurance policy, payable in the near future, not only as an endowment but also in dividends.

I believe this—that the action of the Executive Council as guided by you has given us a clear-cut understanding of the conditions within the Society, and that your work indicates the need for a morale-building program during the next two or three years. The first step in a program of this kind is the appointment of an Executive Secretary. We will come to it sooner or later, or else we will give up the Society. I for one, and in this I voice the opinion of our staff, think that it should come sooner and not later. I think each of the Sections should be requested to devote some of the coming winter's meetings to a rebuilding of our esprit de corps to the 1908 standard.

I am sorry indeed that I will not be able to attend the annual meeting of the Society. I shall be in the hospital at that time. I wish to express to you my congratulations on the constructive work you have accomplished in Society affairs. We know now how we stand and since we have that knowledge, I am confident the remedy is easily found.

Very sincerely yours,
T. C. Spaulding,
Dean, School of Forestry, University of Montana

Letter Two

Denver, Colorado, December 10, 1925

To the Secretary of the Society:

A meeting of the Denver residents of the Rocky Mountain Section (including three out-of-town Forest Supervisors), was held last night, a total of twelve being present. The questions mentioned in the recent report and recommendations of the Executive Council were discussed at some length, the unanimous opinion of those present being as follows:

Annual Dues

Dues should not be increased as recommended. We are strongly of the opinion that the resignations of Members and Senior Members will be so numerous that the desired results will not be attained, and that it will result in a smaller number carrying an unusual burden.

Most of the members of this section have access to the Journal of Forestry through copies provided officially, so the annual dues

amount to merely a contribution to the Society. It is realized that the dues are not large but most members receive comparatively small salaries and have many obligations to meet. These obligations are too numerous and varied to attempt to enumerate, but with families to bring up and educate and many organizations of a local character which members are in duty bound to support, it was the feeling of those present that it would be very bad policy to raise the dues as suggested.

Some difficulty is experienced in securing new members and retaining those that now belong. In fact, a number of members of this section are constantly exerting pressure to have members continue their support of the Society. Despite this fact, a number have dropped out and there are a number who do not belong because they feel that the expense is greater than they can afford.

Accordingly, we feel very strongly that a very difficult situation will result with regard to retaining anywhere near the present membership and in securing additional members if the increase in dues is made effective.

Additional Members

As a suggestion for meeting the need for increased funds, it is our feeling that the membership of the Society could be greatly increased without lowering standards. Men from Forest Schools are being brought in as members without much delay. With the increase in the number of Forest School graduates going into the Forest Service and into foresty work for private companies the membership should be constantly increased. It would also be possible to increase the membership of the Society greatly by following a more liberal policy in taking in as members men without technical school training in forestry who have been doing creditable forestry work for a period of years. For example, there are many rangers—probably at least thirty—could be selected in the Rocky Mountain District, who have been administering timber sales, participating in timber survey work and research work very satisfactorily, as well as accomplishing effective fire protection. Some have been doing this work for twelve or fifteen years, or longer, and have done much to develop various policies. There are similar men in the other districts, and those of this class, and if they were added to the Society it would mean a large increase in the number of members. Men of this character should be as well or better qualified for members than those who are engaged in work allied to forestry, who have little actual knowledge of the application of forestry in the

woods. These men would be a real addition to the Society, and as we see it, would not lower the standards.

The constitution of the Society provides for electing men of the type mentioned but for some reason few have been proposed. This is probably because the Executive Council is more exacting about passing on non-technical men than those who have attended Forest Schools.

Frequency of Publication of Journal

If by following the suggested plan of taking in new members, with present dues it is not possible to employ the necessary clerical assistance discussed in the following paragraph, and increase the frequency of publication of the Journal to twelve issues per year, it is our feeling that the number should be continued at nine per year or even reduced to eight if necessary. It would seem that the number of issues cannot be increased until the membership becomes such that this can be accomplished with present dues. If material available for publication is increasing, those articles which are of the greatest general value should be published. Presumably this plan is being followed. In this connection, it appears that periodicals are publishing more material on forestry subjects than ever before and possibly they could be relied upon to a greater extent in this connection in the future.

Executive Secretary

We feel that the Society should not attempt to finance the employment of a high grade man for executive secretary, who will exercise real leadership in society affairs. It will be an expensive undertaking to employ a man of the class suggested, with the necessary clerical assistance, and the tendency would be for him to spend time in contacts of a more or less advertising and social nature, rather than to devote his energies more strictly to forestry. There are a number of organizations, such as the American Forestry Association, and the American Tree Association, which maintain staffs and cover the field suggested pretty well.

The various members of the Executive Council might better exercise the leadership which is desirable, for these men appear to us to be the logical ones to represent the Society. By their alternating or by calling upon the individual nearest the point where contact is desirable, it should not be burdensome on any individual. This would mean the expenditure of more money for travel by members of the Executive Council, but would limit the expense of a clerical nature to that necessary for the employment of first class clerical assistance.

The members present at the meeting last night were of one opinion in regard to the above matters, and it has seemed best to send you this letter. We hope that action to increase dues will not be taken unless the vote of the Society is overwhelmingly in favor of it, for we feel strongly that it will not be for the best interests of the Society, particularly as it applies to the region west of the Mississippi River.

Sincerely,

RESS PHILIPS,

Vice-Chairman, Denver Section

REPORT OF THE EXECUTIVE COUNCIL

Approved by the Society

In accordance with the practice started in 1924 the Executive Council has held a two-day session (December 14 and 15), in advance of the annual meeting of the Society, to consider and recommend to the Society action on Society affairs and matters of interest to the Society. It respectfully submits the following report on the more important questions considered:

POLICY

For some time a need has been felt for a concise statement of the policy to be followed by the Society. On June 10, 1925, the Executive Council submitted to members of the Society such a statement, which has met with almost unanimous approval. With some slight revision, suggested by comments received from the members, the Council has adopted that statement of policy in the following form:

"The object of the Society is to promote the development of forestry through the united action of the profession. It will therefore initiate and support such measures and activities as in its judgment will further this end. It is particularly interested in placing forest production, forest utilization, and forest policies on a scientific foundation of established facts, through the conduct of adequate research and the practical application of results.

"The Society makes no attempt to crystallize its views in the shape of any formal creed. It regards its field as the development of 'forestry' in the broadest sense of that term, and will take such action as in the judgment of its members is best suited to attain that object. Its beliefs will speak for themselves in the program adopted. This program will naturally vary with varying conditions, and will emphasize from time to time those parts of the field which are in particular need of attention.

"As an essential part of its efforts to develop the science and apply the art of forestry, and as the group which by training and experience is most familiar with forest problems, the Society will not hesitate to express its views on matters of policy and legislation. It will not ignore its opportunity and its responsibility to exercise leadership in public affairs for fear that it will be accused of engaging in 'propaganda' or 'politics,' that such leadership will lead to con-

troversy, or that subsequent developments may necessitate modification of its recommendations. The Society as a whole will ordinarily take action only in matters of national importance, leaving local questions to be handled by the appropriate sections.

"Within the profession itself the Society will encourage individual achievement and expression; will build up the spirit of scientific endeavor and of public service; will maintain high standards of professional responsibility; will provide an open forum for the interchange of views upon forestry and allied subjects; will render personal service to and protect the interests of its members; and will foster an esprit de corps and spirit of comradeship among foresters."

Program

The Council gave consideration also to the adoption of a program to make the Society Policy effective. After discussion of the program as given in the Council's statement of June 10, 1925, it has adopted the following as the present program for the Society:

"The Society will make this policy effective by the adoption and execution of a concrete program, the details of which will obviously change from time to time. For the present particular emphasis will be laid on the following:

1. Inclusion within the Society of all qualified foresters; maintenance of a high standard of Senior Membership; and promotion of members to this grade as rapidly as their qualifications permit.

2. Establishment and strengthening of strong local sections in all parts of the country.

3. Promotion of committee activity in important phases of forestry.

4. Constant improvement in the Journal of Forestry as the official organ and principal medium for expression of the Society.

5. Development and accumulation of technical knowledge in all phases of forestry,—(a) through the encouragement of individual achievement; (b) through committee activity aimed to stimulate and coordinate research; and (c) through steps to obtain adequate support for all forest research agencies.

6. Actual practice of forestry on all forest land. Individual and committee activity will attempt to bring about a better understanding on the part of the public and of timberland owners as to what forestry involves; and to obtain the establishment of demonstration forests, the widespread application of silviculture as well as protective measures, and the management of forest properties on a sustained yield basis.

7. Increasing the utility and value of forests by devising better methods of utilization and securing their adoption by both growers and users of forest products.

8. Endorsement of or opposition to proposed forest legislation or policy.

9. Development of international relations in forestry, with particular reference to the collection and dissemination of information regarding forestry in other countries, and to the establishment of more intimate contacts with foresters in other countries, including the exchange of workers.

10. Active co-operation with organizations interested in forestry or allied fields."

Forest Legislation

At its recent meeting the Council approved of the McNary-Woodruff bill for the extension of National Forests, and decided to urge its passage on the appropriate committees of Congress. The

Council also considered the progress in the development of a national forest policy represented by the Clarke-McNary Act. The Council recognizes fully the benefits to forestry that may come from the effective administration and application of this Act, in which foresters should participate sympathetically and earnestly; it believes, however, that the accomplishments to be expected from it should not be over-estimated.

Adequate fire control, equitable taxation, and tree planting, the important provisions in the Clarke-McNary Act, are not by themselves sufficient to meet the basic requirement for forestry in the United States; that is, that all of the potential forest lands be made and be kept productive of forest growth. In addition, timberland owners, with the full co-operation of the forestry profession, must meet the public assistance provided by the Act by adopting improved methods of handling their lands. It is essential that this fact be recognized and that public attention be focused on the need to take any additional measures found necessary to fully assure continuity of production on forest land. The need for additional legislation will be largely determined by the attitude of private timberland owners and operators toward maintaining their forest lands in a state of productivity.

While sufficient information is already available to enable timber owners and users to adopt greatly improved practices, much more information will be needed as our practice becomes more intensive. The Federal Forest Service, State Forest Departments, and Forest Schools are trying to develop such technical information. The investigative work so far done, however, is still on a small scale and more or less sporadic in character. We greatly need systematic provision for continuous and permanent forest investigation which will establish a solid basis for forest practice. The Council, therefore, strongly favors the passage of an organic act, similar to the Hatch, Adams, and Purnell acts, placing the agricultural experiment stations on an adequate and permanent basis, which would render a similar service for forest experiment stations and for forest products research.

Budget

From present indications the Council's recommendation for an increase in annual dues will not be approved. The Council will be deeply disappointed if this is the case. Failure to provide increased funds from this source simply means that to carry on the work to which the Society is definitely committed, our reserve fund of approximately $3,200 must be drawn upon to meet an inevitable deficit for

1926 of approximately $1,600. It means further that the number of issues of the Journal of Forestry must be reduced from nine to eight per year. The Council believes that when the members of the Society come to a full realization of its financial needs, to do only the essential work, they will readily agree to an increase in dues.

Grazing on National Forests

During the past year there has been a concerted effort on the part of the stock industry of the West to bring about certain changes in the administration of grazing on the National Forests. Among the objects sought are the placing of grazing fees at the cost of administration, the granting of legal easements to grazing permitees, and the establishment of a Board of Grazing Appeals not wholly subject to the jurisdiction of the Secretary of Agriculture. The Executive Council believes that the accomplishment of these aims would not only interfere seriously with the administration of the National Forests for the production of timber and the protection of the water supply, the two main purposes for which they were created, but would also threaten the integrity of the entire National Forest policy.

The Council desires to go on record as believing strongly that there should be no interference with the present authority of the Secretary of Agriculture to exercise complete control over grazing and other secondary uses of the National Forests.

World's Forestry Congress

The Executive Council believes that the World's Forestry Congress, to be held at Rome in the spring of 1926, offers an exceptional opportunity for the foresters of this country to establish closer relations with and to further co-operation between professional foresters in the United States and other countries, and hopes that the Society may be represented at the Congress by a strong delegation. It suggests the following as the main objectives of the Society representatives: To take the initiative in reviving the International Union of Forest Experiment Stations with the idea of having definite steps in the reorganization of the Union taken at the International Congress of Plant Sciences, to be held at Ithaca, N. Y., in August, 1926; to bring to the attention of the Congress the desirability of holding an International Conference on the Conservation of Natural Resources; to put the work of the International Institute of Agriculture in Forest Statistics on an adequate and permanent basis; to include forestry in the World's

Census of Agriculture to be taken by the Institute in 1930; to determine the possibility of service by the Institute to forestry in other fields; to co-operate in the preparation of an International Classification of Forest Literature and of International Dictionaries of forest terms; and to further the development of friendly relations and the exchange of technical information by the interchange of forest workers in this and other countries.

S. T. Dana
R. Zon
E. H. Frothingham
C. R. Tillotson
R. Y. Stuart

REPORT OF SECRETARY

Propaganda has been defined as an effort to make people believe something against their will. At the risk of being termed a propagandist I feel that it is my duty to lay certain conditions before the Society relative to the present volume of work in the Secretary's office which has been gained through the present incumbency. With the aid of two assistants your Secretary struggled with the duties of the office until May. During this time a rather intimate knowledge was gained as to the amount of work devolving upon the office. It must be borne in mind that there are now 14 Sections of the Society, and a membership dispersed throughout the world. There are over a thousand members of all grades at the time this report is prepared and about 800 subscribers in addition. Naturally we deal with changes of address, group memberships, mailing circulars, subscription agencies, advertising agencies, non-receipt of Journal, lost remittances, foreign correspondents, and all in all there is a mass of minutae of a volume that is not appreciated by any one who has not been in the thick of it in recent years.

On May 1 the Executive Council appointed an Executive Secretary in the person of Mr. Elmer R. Hodson, who was elected Secretary of the Society for the calendar year 1918 and served for that year and also for an additional 4 months previously in the latter part of 1917 during the absence in France of Major R. Y. Stuart. Mr. Hodson has also assumed the clerical duties of Treasurer, being bonded for that purpose. He has checked over membership lists and records of subscriptions, inventoried the back numbers of Journal, Proceedings,

and Quarterly, analyzed the referendum votes, sent out various communications, and conducted the duties of the Secretary as previously described.

It would be misleading and unfair to create the impression that the Secretary's office had monopolized the clerical field of work for the Society. Our President has worked diligently on projects of a nature that could have been handled largely by the Secretary's office, and the Member in Charge of Admissions has covered a field of endeavor which was an unwarranted burden upon him for the reason that the Executive Secretary was not prepared at the time to take the details over. There is much of the Council and committee work which has been handled by members, uncomplainingly, which should devolve upon the Secretary.

The question has arisen in your minds as to the part the elected Secretary has played in his role. I am frank to confess but little, relative to the total amount of work since May 1, on account of almost continuous absence from Washington on field trips.

We can definitely discard the idea that any member of the Forest Service can assume the burden as Secretary in an acceptable manner. The membership is too large and too widely distributed to admit of a further expedient of this sort.

Government work becomes more exacting, and rightly so, from year to year, and but little should be asked as to contribution of time and office space in the future. The Society as a whole, in my humble opinion, owes the Forest Service a debt of gratitude for the past favors. It would be ungrateful to ask for further contributions of the sort it has received in the past.

The members of the Society should be fully aware of the fact that they will receive in the future in about an exact proportion as to their investment in the Society. If we believe in our profession as do members of similar societies, we must show this belief in a very practical way. My experience leads me to state that before the Society can demonstrate its present strength as an organization, it must have a paid secretary from the membership of the Society whose duties will be to conduct its business and to promote the welfare of the members.

The last annual meeting of the Society laid upon the Secretary the duty of correlating the territorial boundaries of the various Sections with respect to each other, and to seek to reach mutual agreements between Sections where there is an overlap.

I have to report the following[1] territorial divisions by Sections:

1. New England—all of the New England States.

2. New York—all of New York State and the metropolitan area of northern New Jersey, covering the residence of members who conveniently meet with the New York Section.

3. Allegheny—West Virginia, Pennsylvania, Maryland, Delaware, and New Jersey except as noted above.

4. Washington—the District of Columbia and State of Virginia north of the James River.

5. Southern Appalachian—North and South Carolina, Tennessee, Kentucky, Virginia south of the James River, portions of northern Georgia, Alabama, Mississippi, Louisiana, exact line to be determined by agreement when Southern Section is organized.

6. Ohio Valley—southern peninsula of Michigan, Ohio, Indiana, Illinois.

7. Wisconsin—Wisconsin except City of Superior, and Northern Peninsula of Michigan.

8. Minnesota—Minnesota and city of Superior, Wis. The Minnesota Section is indifferent as to annexing the States of Iowa and Missouri.

9. Northern Rocky Mountain—North Dakota, Montana, Idaho north of the Salmon River, eastern Washington to District 1 boundary.

10. Central Rocky Mountain—South Dakota, Nebraska, Kansas, Colorado, and Wyoming.

11. Intermountain—Idaho south of the Salmon River, Utah, Nevada and Arizona north of the Grand Canyon.

12. Southwestern—New Mexico and Arizona south of the Grand Canyon.

13. California—California and District 5 boundary in Nevada. The California Section raises a question as to desirability allocation of Hawaii and the Philippines in the California Section. In our opinion this should be a matter of self-determination for these detached units.

14. North Pacific—Oregon, eastern Washington to District 1 boundary, British Columbia and Alaska.

During the year the Forest Club at the University of Washington became affiliated with the Society under Article 7 of the constitution.

[1] During its two-day session at Madison, Wis., Dec. 14 and 15, the Executive Council decided to propose some modifications of the divisions suggested here. These will be submitted to the Sections for consideration.

This is the first Forest School Club to take advantage of the provision for affiliated membership in the Society.

The Society co-operated actively with the American Forest Week Committee in the observance of that week throughout the country. Co-operation by all of the Sections was definitely requested with special reference to technical forestry rather than such items as fire control, which are already covered fairly adequately by other organizations.

Two statements were issued by the Executive Council to all members of the Society. These dealt with the Society's policy, program, and organization and attempted to bring about some agreement on the part of the membership as to the policies and aims of the Society and ways and means of attaining them. The second statement contained recommendations for constitution amendments, giving the Members the right to vote and providing for increase in dues from $4 to $8 for Members and from $5 to $12 for Senior Members.

As required by the constitution, the Secretary announces the result of election of officers for the ensuing year as follows:

For President.....S. T. Dana
For Vice-President.....Paul G. Redington
For Secretary.....G. H. Collingwood
For Treasurer.....S. B. Detwiler
For Council.....T. T. Munger

During the year ten members have been taken from us by death.

Name	*Date*	*Grade of Membership*
Frederick E. Olmsted	Feb. 13	Senior
William Lindsay	March	Member
Irvin C. Williams	April 5	Associate
Geo. R. Orr	May 29	Senior
Stuart J. Flintham	June 11	Senior
Dr. Gunnar Schotte	Aug. 28	Corresponding
Sir William Schlich	Oct. 1	Honorary
R. H. Campbell	Nov. 26	Senior
Prof. Filibert Roth	Dec. 4	Fellow
Bolling Arthur Johnson	Dec. 19	Associate

Four Seniors, four Members and no Associates resigned, and six Seniors, 11 Members were dropped for non-payment of dues.

The membership now consists of seven Fellows, 486 Seniors, 555 Members, 82 Associate Members, 12 Honorary Members, and six Corresponding Members. This makes a total of 1,148 of whom 25 have not announced their acceptance. C. G. Smith, *Secretary*

REPORT OF THE EDITORIAL BOARD

The Journal of Forestry continued to hold not only its own among the technical magazines of the country, but also to grow in circulation and prestige. Without boasting, it is the only technical forestry organ on the North American Continent and is probably the most influential English journal of its kind in the world today.

The Editorial Board followed out the policy laid down last year by the Executive Council to maintain the Journal on the level of the average forester rather than to confine its pages to picked contributions from exceptional members. If the Journal, therefore, exhibits now a higher average level, it simply reflects the growth of the profession as a whole. The Editorial Board flatters itself that there has been constant improvement in the Journal, yet it is not blind to its many defects. Probably the average reader does not realize the great amount of mechanical labor involved in preparing manuscripts for the printer and catching up the mistakes in galley proof which creep in unintentionally. With no overhead charges for expert galley proof reading, mistakes which remain un-noticed until the Journal is issued are still very numerous. If some of its mistakes have been caught up and the mechanical make-up of the Journal improved, it is largely due to the valuable assistance given gratuitously by A. E. Wackerman.

The Journal is now a truly international publication in its contributions and distribution. Its subscribers are scattered all over the world as may be seen from the following table of circulation by countries. (Table I.) It is still, however, a strictly professional paper in the same sense that most of its subscribers are technical foresters. Of the 1,763 subscriptions, only 174 go to libraries and 19 to lumbermen; while 1,570 go to professional foresters. (Table II.)

This would indicate that there is a practically untouched field for placing the Journal before lumbermen and other people who may be interested in the information furnished by the Journal.

Because of the rapid growth of the Journal, the estimates for printing and distribution based on the previous year's experience have invariably been upset. Thus during the last year the number of copies had to be increased from 1,600 to 1,900 and then to 2,000 copies which was not fully provided for in the estimate. Occasional numbers like the September-October number devoted to taxation are in greater demand than average issues. In order to meet such a demand extra copies were printed which again proved an added drain on the regular allotment. The number of new members is always an unknown quan-

Table I.

Distribution of the Journal of Forestry by Countries

North America	1602		
United States		1351	
Canada		240	
Canada		240	
Alaska		8	
Porto Rico		2	
Mexico		1	
South America	3		
Argentine		1	
Brazil		1	
British Honduras		1	
Europe	40		
England		6	
Germany		6	
Russia		4	
Denmark		4	
Scotland		2	
Ireland		2	
Switzerland		2	
Holland		2	
Italy		2	
Norway		2	
France		2	
Finland		2	
Spain		1	
Poland		1	
Cyprus		1	
Czechoslovakia		1	
Asia	45		
Japan		30	
India		11	
China		3	
Ceylon		1	
Africa	32		
Nigeria		17	
South Africa		11	
Gold Coast		1	
Liberia		1	
Uganda		1	
Hawaii	4		
East Indies	17		
Philippine Islands		11	
Sumatra		3	
Borneo		1	
Federated Malay States		1	
Straits Settlement		1	
Australasia	20		
New Zealand		12	
Australia		8	

Summary

Domestic circulation	1,351	(77%)
Foreign circulation	412	(23%)
Total	1,763	(100%)

Table II.

Circulation of the Journal of Forestry

Members and Subscribers

Senior members	475
Members	548
Subscribers	713
Complimentary subscribers	27
Total	1,763

Class of Readers

Professional foresters	1,570
Libraries	174
Lumber companies	19
Total	1,763

tity and they must be provided with copies the printing of which must again be paid for from the regular allotment. Any increase in advertising matter, the proceeds of which goes to the general funds of the Society, adds to the cost of printing the Journal. Should our advertising develop on a large scale, as we hope it will do during this year, the printing of the advertising matter will have to be taken from the regular allotment.

All this points to the necessity of having, in addition to a minimum budget allotment, some other flexible fund which could be used to take care of the rapid, unforeseen expansion of the Journal in circulation and advertising. At present all the revenue from the sale of back numbers and from advertising goes into the general fund. It seems that a part at least, if not the entire proceeds of the Journal, should be held in reserve to take care of that expansion.

In publishing a monthly magazine, unless it can be run on a wide margin of material, decision must be made quickly and on the spot. Long delays in correspondence are apt to delay the issuance of the Journal on regular dates. If two weeks are allowed for the printer to set up the material, the editor really has only two weeks in which to prepare the material for the next issue because while the material goes to press, there is galley and page proof to read and a thousand and one things to straighten out with the printer. While the supply of articles is increasing, it is still not large enough to provide for several months ahead and quick action and decision on the material is imperative. It seems that for the present at least it is necessary to have one responsible editor who must make his decisions promptly if the Journal is to be kept running regularly.

In publishing the Journal the Society assumes responsibilities toward a general public outside its own members. We have subscribers and advertisers who pay for the Journal and expect their full value for the money spent. I want to impress upon the Society that the publication of the Journal is the most vital and crucial activity by which it is judged not only by its members but by outsiders. We have been taking too much for granted the smooth running of the Journal as we take the succession of night by day and have not appreciated sufficiently the labor, the worry, and the moral responsibility of those in direct charge of the printing and editing of the Journal.

On several occasions I brought to the attention of the Society the matter of the need of increasing the advertising carried in the Journal. I attempted last year to employ a student to secure advertising on a

commission basis but he proved to be unsatisfactory. Arrangements have now been made with a more experienced and active man with more hope of success. Our goal is a minimum of $1,000 in advertising a year. The advertising rates should be increased to $150 for a full page for twelve issues, $90 for a half page, and $50 for a quarter page. The present rates which were put in force last year are inadequate for a publication such as the Journal.

A campaign for new subscriptions carried on by the members of the Society themselves should be inaugurated.

The recommendations of the Editorial Board of the Journal of Forestry may be briefly summarized as follows:

1. An annual budget with a minimum amount of $7,900 per year plus the receipts from the sale of back numbers and advertising. If this entire revenue cannot be turned back into the Journal at least one-half should be kept in a reserve fund for the expenses of the Journal.

2. An expert proof reader should be hired to safe-guard the mechanical appearance of the Journal. The cost should not exceed $25 per issue.

3. A full volume of 12 issues should be published with an average of 112 pages per issue, exclusive of advertising.

4. A special student subscription rate of $3.00.

5. The need of a campaign to increase the subscriptions to the Journal to be conducted by the Sections.

6. The need of increased advertising and higher rates.

7. Increase in the subscription price of the Journal from $4.00 to $5.00 a year.

REPORT ON ADMISSIONS

Elections During the Year

Before turning over the admissions work to me, in March, 1925, Mr. Bryant announced the election of the following candidates from the printed list of September 25, 1924, upon whom action was not completed at the time of the last annual report on admissions:

Member

Chapler, Raymond H.; Fivaz, Edward A.; House, Homer D.; Jahn, Alfred P.; Maxwell, R. B.; Middour, J. C.; Nelson, Louis A.; Poch, Fritz J.

Senior Member

Hawkins, Guy C.; Neff, Philip; Perry, Walter J.

Two printed lists of candidates were issued in 1925, dated May 1 and November 12. The May 1 list contained 188 candidates. Of these 112 were elected members and 22 senior members, effective July 20, 1925. The election of approximately 60 per cent of the list within 50 days from the time they were submitted to the Executive Council for ballot is probably as prompt action as can be expected from a Council as widely distributed as ours. As completed, on December 14, the elections from the May 1 list may be summarized as follows:

NOMINATIONS AND ELECTIONS

	Member	Senior Member	Associate Member	Honorary Member	Total
Nominated	132	51	4	1	188
Elected	126	40	1	..	167
Rejected	9	8	4	..	21

Three candidates for senior member were elected member. One candidate for honorary member was elected associate member.

The November 12 list contained the names of 68 candidates for member, 10 for senior member, and 1 for associate member. This list is now before the Executive Council for ballot.

NOMINATIONS FOR FELLOW

In accordance with past practice the sections and the Executive Council were canvassed for nominations for the grade of Fellow. Only one nomination was forthcoming, that of R. T. Fisher, who was nominated by petition of the New England section. The result of this election will not be known before the end of the year.

LIST OF ELECTIONS, 1925

Member

Anderson, Emil A., Deputy State Forester, Kalispell, Mont.
Auden, Alfred J., Spanish River Paper and Pulp Mills, Sudbury, Ontario.

Bacon, Russel S., U. S. Forest Service, Albany, Ore.
Barker, Claude K., U. S. Forest Service, Sonora, Calif.
Barrett, Leonard I., U. S. Forest Service, Portland, Ore.
Bauer, Hans, Abitibi Paper and Pulp Co., Iroquois Falls, Ontario.
Baumhofer, Lynn G., U. S. Bur. of Entomology, Nebraska National Forest, Halsey, Nebr.
Bedwell, Jesse L., U. S. Office of Blister Rust Control, Spokane, Wash.
Berggren, Harold R., Minn. Forest Service, Minneapolis, Minn.
Bisson, Adolph L., Abitibi Power and Paper Co., Ltd., Iroquois Falls, Ontario.

Bond, Willard F., U. S. Forest Service, Albuquerque, N. Mex.
Bowman, A. B., U. S. Forest Service, Libby, Mont.
Bradder, Wilbur E., Agent, Blister Rust Control, Forestry Dept., Montpelier, Vt.
Browning, Philip M., Chief Forest Fire Warden, Buckhannon, W. Va.
Buell, Jesse H., U. S. Forest Service, Seattle, Wash.
Burgess, Thomas H., U. S. Forest Service, Republic, Wash.
Burton, Sidney S., Foresty Dept., Univ. of Minn., St. Paul, Minn.

Calland, J. W., Consulting Forester, Dayton, Ohio.
Callward, Floyd M., Vt. Blister Rust Control, Montpelier, Vt.
Carson, Kenneth W., Stanley Rule & Level Co., New Britain, Conn.
Carter, Linton A., U. S. Forest Service, Eugene, Ore.
Cecil, Charles A., Cornell Wood Products Co., Duluth, Minn.
*Chapler, Raymond H., U. S. Forest Service, Portland, Ore.
Christianson, David A., U. S. Forest Service, Wallowa, Ore.
Claridge, Frederick H., A. P. W. Pulp & Paper Co., Ltd., Sheet Harbor, N. S., Canada.
Conrad, Howard H., Forester, 54 Church St., Kingston, Pa.
Craig, Ronald B., U. S. Office of Blister Rust Control, Springfield, Mass.
Cronemiller, Fred P., U. S. Forest Service, Willows, Calif.
Crowell, Ralph E., U. S. Forest Service, Missoula, Mont.
Crumley, J. J., State Forester's Office, Wooster, Ohio.

DeFlon, Leland L., Forest Products Lab., Madison, Wis.
Diehl, James N., U. S. Forest Service, Kalispell, Mont.
Dressel, Karl, Mich. State College, East Lansing, Mich.

Eddy, Howard J., 1213 Oakton St., Evanston, Ill.
Elliott, Joseph E., U. S. Forest Service, Susanville, Calif.
Engle, Allen B., 2706 Harvard Ave., N. Seattle, Wash.

Fenby, Edwin J., U. S. Forest Service, Tacoma, Wash.
Fenger, G. K., U. S. Forest Service, Delta, Colo.
Fivaz, Edward A., Box 51, Warrensburg, N. Y.
Foss, William M., N. Y. State Conservation Com., Albany, N. Y.
Fry, W. E., U. S. Forest Service, Augusta, Mont.

Gooch, W. L., Elk River Coal & Lbr. Co., Swandale, W. Va.
Grabow, Rudolph H., Forest Products Lab., Madison, Wis.
Graham, Leslie B., Univ. of Calif., Berkeley, Calif.
Grapp, Lloyd O., Menominee Indian Reservation, Keshena, Wis.
Griffee, W. E., Forest Products Lab., Madison, Wis.

Harris, Marion R., U. S. Forest Service, Baker, Ore.
Haskell, Frank E., W. M. Carney Mill Co., Atmore, Ala.
Hauge, A. G., U. S. Indian Service, McNary, Ariz.
Heathman, H. R., Bethlehem Steel Corp., Hopewell, Pa.
Hoar, Walter G., U. S. Forest Service, Coeur d'Alene, Ida.
Hobart, Seth G., Gauley Coal Land Co., Greenwood, W. Va.
Holtz, Irenus B., Penna Power & Light Co., Williamsport, Pa.
Hosley, Neil W., Harvard Forest, Petersham, Mass.
House, Homer D., N. Y. State Museum, Albany, N. Y.

Ingram, Douglas C., U. S. Forest Service, Portland, Ore.

Jahn, Alfred P., U. S. Forest Service, Flagstaff, Ariz.
Jacobs, Allen W., Western Forestry and Conservation Assn., 511 Spalding Bldg., Portland, Ore.
Johnson, Robert P. A., Forest Products Lab., Madison, Wis.
Jones, Clayton F., Forester, E. S. Bryant tract, Randolph, Vt.

Keen, Frederick P., U. S. Bur. of Entomology, Palo Alto, Calif.
Kellogg, Leonard F., U. S. Forest Service, Mt. Shasta, Calif.
Kline, C. Weldon, 925 Fremont St., Portland, Ore.
Knapp, F. Malcolm, Univ. of British Columbia, Vancouver, B. C.

Littlefield, Edward W., Blister Rust Control, N. Y. Conservation Commission, Lake George, N. Y.
Lockard, Charles R., U. S. Forest Service, Eugene, Ore.
Loughborough, W. Karl, Forest Products Lab., Madison, Wis.
Lutz, Harold J., U. S. Forest Service, Ketchikan, Alaska.

Maclay, Robert D., U. S. Forest Service, Okanogan, Wash.
MacMillan, W. B., Dept. of Forestry, Penn State College, State College, Pa.
McArdle, Richard E., U. S. Forest Service, Portland, Ore.
*McCaskie, George T., Jr., 260 Dunnell Road, Maplewood, N. J.
McGinn, John T., Pacific Lbr. Inspection Bureau, Portland, Ore.
McLeod, Kenneth, Jr., 2174 University Ave., Berkeley, Calif.
Marshall, Robert, Harvard Forest, Petersham, Mass.
Maxwell, R. B., Garrett Bldg., Baltimore, Md.
Middour, J. C., Tremont, Schuylkill Co., Pa.
*Miller, John M., Box 38, Palo Alto, Calif.
Moll, Wilford P., Penna Power & Light Co., Stroudsburg, Pa.
Monroe, Fred D., U. S. Forest Service, Baker, Ore.
Mowat, Edwin L., Oregon Agric. College, Corvallis, Ore.
Muck, Lee, U. S. Indian Service, Spokane, Wash.
Mulholland, William D., N. Y. Conservation Com., Albany, N. Y.
Myers, Frank B., U. S. Forest Service, Seattle, Wash.

Nelson, Arthur L., U. S. Forest Service, Deadwood, S. Dak.
Nelson, E. W., U. S. Forest Service, Albuquerque, N. Mex.
Nelson, Louis A., West Coast Lumbermen's Assn., Portland, Ore.
Nicholson, Nels O., U. S. Indian Service, Nespelem, Wash.
Norris, Thomas G., Pa. Board of Game Commissioners, Fayetteville, Pa.

O'Neil, William J., Cloquet Lumber Co., Cloquet, Minn.
Ostergaard, Harold, U. S. Forest Service, Libby, Mont.

Pagter, Lawrence B., U. S. Forest Service, Republic, Wash.
Parlow, Allen E., Provincial Forest Branch, Vernon, B. C.
Pederson, Fred C., State Forester's Office, Charlottesville, Va.
Peel, William F., White Bear, Minn.
Person, Hubert L., U. S. Bur. of Entomology, Northfork, Calif.
Phillips, George R., Asst. State Forester, Indianapolis, Ind.
Pillow, Maxon Y., Forest Products Lab., Madison, Wis.
Pimley, A. E., Minn. Forest Service, St. Paul, Minn.
Poch, Fritz J., U. S. Forest Service, Deadwood, S. Dak.
Probstfield, Edwin E., Dept. of Forestry, Univ. of Minn., St. Paul, Minn.
Putnam, Robert W., U. S. Forest Service, Baker, Ore.

Quick, Walter J., Jr., U. S. Forest Service, Deerfield, Va.

Rankin, Duncan G., Blister Rust Agent, Albany, N. Y.
Rees, Louis W., N. Y. State College of Forestry, Syracuse, N. Y.
Reineke, Lester H., U. S. Forest Service, Washington, D. C.
Rengstorff, Erwin H., Bloedel, Stewart & Welch Corp., Myrtle Point, B. C.
Richards, H. R., U. S. Forest Service, Phillipsburg, Mont.
Riley, Marvin C., U. S. Forest Service, Libby, Mont.
Roberts, Benj. L., Cherry River Boom & Lbr. Co., Richwood, W. Va.

Sandvig, E. D., U. S. Forest Service, Missoula, Mont.
Sayre, Howard R., Mich. Dept. of Conservation, Lansing, Mich.
Schaeffer, Charles H., Pa. Game Commission, Harrisburg, Pa.
Schlatter, Ernest J., U. S. Forest Service, Portland, Ore.
Schoeller, Jacob D., U. S. Forest Service, Las Cruces, N. Mex.
Segersten, Axel A., Blodgett Lbr. Co., Portland, Ore.
Shivery, George B., U. S. Forest Service, New Orleans, La.

*Nominated for Senior Member but elected Member.

Shulley, Frederick J., Tenn. Division of Forestry, Nashville, Tenn.
Skuce, Thomas W., Extension Div., Univ. of W. Va., Morgantown, W. Va.
Soderston, Herbert R., Abitibi Power & Paper Co., Iroquois Falls, Ont.
Stanford, Everett R., 409 N. Wilson Ave., Alhambra, Calif.
Steer, Henry B., U. S. Indian Service, Hoquiam, Wash.
Stevens, Raymond E., 4416 McCulloch St., Duluth, Minn.
Streinz, A. J., U. S. Forest Service, Dist. 7, Washington, D. C.
Sundling, Hugo L., U. S. Forest Service, Taos, N. Mex.

Teachout, P. H., Supt. Groton State Forest, Lanesboro, Vt.
Thompson, Allen E., Seattle City Forester, Camp 1, Cedar Falls, Wash.
Tilden, Floyd, Minn. Forest Service, St. Paul, Minn.
Trenk, Fred B., Dept. of Forestry, Fidelity Bldg., Baltimore, Md.
Tucker, Allen, U. S. Office of Blister Rust Control, Durham, Conn.

Weber, Wallace W., Forest Products Lab., Madison, Wis.
*Wilson, Robert, Northern Great Plains Field Station, Mandan, N. Dak.
Wood, Orren M., Yale Forest School, New Haven, Conn.

Yetter, Harry S., U. S. Forest Service, Bend, Ore.

*Nominated for Senior Member but elected Member.

Senior Member

Allen, Shirley W., American Forestry Assn., Washington, D. C.
Anderson, Parker O., Forest Service, St. Paul, Minn.
Ayers, B. K., Willis & Ayers, Concord, N. H.

Brown, Lee P., U. S. Forest Service, Medford, Ore.
Brundage, Marsden R., U. S. Forest Service, Sonora, Calif.
Burnes, John D., 5008 Vincent Ave., Minneapolis, Minn.
Burnett, Orville P., U. S. Forest Service, Alturas, Calif.

Chapline, W. R., Jr., U. S. Forest Service, Washington, D. C.
Chapman, C. S., Weyerhaeuser Timber Co., Tacoma, Wash.
Conzet, G. M., Minn. Forest Service, St. Paul, Minn.
Cook, Irwin W., Univ. of Mont., Missoula, Mont.

Davis, Edward M., Forest Products Lab., Madison, Wis.
Davis, Virgil B., Union Lumber Co., Fort Bragg, Calif.
Demmon, E. L., U. S. Forest Service, So. Exp. Sta., New Orleans, La.

Ericson, Oliver F., U. S. Forest Service, Portland, Ore.
Everitt, John S., U. S. Forest Service, Quincy, Calif.

Flintham, S. J. (deceased).
Furst, Fred W., U. S. Forest Service, Baker, Ore.

Gowan, George M., U. S. Forest Service, Placerville, Calif.
Graham, Samuel A., Univ. of Minn., St. Paul, Minn.

Hanson, T. S., Univ. of Minn., St. Paul, Minn.
Hawkins, Guy C., New England Box Co., Winchester, N. H.
Houghton, Lloyd E., Great Northern Paper Co., Bangor, Me.
Hunt, G. M., Forest Products Lab., Madison, Wis.

Jones, G. Willard, U. S. Forest Service, Haugan, Mont.

Lyford, Charles A., James D. Lacey & Co., Seattle, Wash.

MacDaniels, E. H., U. S. Forest Service, Portland, Ore.
Manning, Ernest C., Forest Branch, Victoria, B. C.
Mattoon, Merwin A., U. S. Forest Service, Asheville, N. C.

Nagel, W. M., U S. Forest Service, Missoula, Mont.
Neff, Philip, U. S. Forest Service, Missoula, Mont.

Newlin, J. A., Forest Products Lab., Madison, Wis.
Nelson, Jesse W., U. S. Forest Service, San Francisco, Calif.

Oppel, Arthur F., Minn. Forest Service, St. Paul, Minn.

Perry, Walter J., U. S. Forest Service, La Madera, N. Mex.

Schumacher, F. X., 305 Hilgard Hall, Univ. of Calif., Berkeley, Calif.
Secrest, Edmund, State Forester, Wooster, Ohio.
Spaeth, John N., Cornell Univ., Ithaca, N. Y.

Tryon, Henry H., Extension Forestry Specialist, Box 114, Aiken, S. Car.

Wahlenberg, W. G., U. S. Forest Service, Haugan, Mont.
Whitney, C. N., U. S. Forest Service, Missoula, Mont.
Wolfe, Kenneth, U. S. Forest Service, Thompson Falls, Mont.

Zeller, Robert A., U. S. Forest Service, Ketchikan, Alaska.

Associate Member

Cornwall, George M., 1032 Fresno Ave., Berkeley, Calif.

Origin of Nominations

The following table shows the origin of the nominations published in the lists of May 1 and November 20, 1925, and also for 1924 and the combined years 1922 and 1923. The table thus extends that given by Professor Bryant in his report for 1924. The "very apparent tendency" toward a reduction in the number of nominations made by individuals which was noted by Bryant has disappeared, and in 1925 71 nominations—over a quarter of the total number received for the two lists—were by groups of individuals.

ORIGIN BY PER CENT OF TOTAL NOMINATIONS

Nominators	1925 Per cent	1924* Per cent	1922-3* Per cent
Individuals	26.6	9.03	15.60
Sections:			
North Pacific	15.0	9.03	2.89
California	13.1	5.56	15.60
Northern Rocky Mountain	8.6	11.81	11.27
New England	8.0	12.50	12.71
Wisconsin	6.4		3.75
Minnesota	6.2		
Ohio Valley	5.0	2.78	
Central Rocky Mountain	3.4	11.81	6.64
New York	3.4	6.94	6.64
Allegheny	3.0	7.59	14.45
Southern Appalachian	1.3	3.47	6.90
Southwestern		14.58	
Washington		4.86	2.60
Intermountain			

*Figures taken from R. C. Bryant's Report on Admissions for 1924.

The statement of the membership policy from Mr. Dana's Report on Admissions for 1920 (Journal of Forestry for February, 1921), contains the following comment upon nominations by individuals:

> "12. In cases where a man resides in a region covered by a Section of the Society, it is desired to have his name passed upon by the Section as a whole rather than by a few individuals in it before being submitted to the Council for action. In cases where this is not done, the Section will ordinarily be asked by the Council for an expression of opinion. * * *"

Reference back to the Section for endorsement has not, to my knowledge, been practiced in the case of nominations made by individuals. Since the origin of such nominations, when made by members of a particular Section, should be of interest to the Section secretary and to the Section as a whole, the following table showing the numbers of nominations made by groups of the members of a single Section, independently of the Section as a whole, has been prepared. In only one or two cases does the group include members outside of the Section designated.

NOMINATIONS BY GROUPS OF INDIVIDUALS WITHIN SECTIONS

Section of which nominating individuals are members	Number of Nominations
New England	16
Allegheny	12
Minnesota	9
Washington	6.5*
New York	4.5*
Ohio Valley	3
Southwestern	3
Central Rocky Mountain	2
California	1
North Pacific	1
Scattered or unassigned	13
Total nominated by individuals	71

*One candidate later endorsed by another Section than that to which the original nominating group belonged.

It is thus evident that only about 18 per cent of the nominations by groups of individuals were by members scattered or without Section affiliations.

SENIOR MEMBERSHIP ELECTIONS

Of the 51 nominations for Senior Member in the May 1 list, 41 were for advancement from the Member grade and 10 were for direct election as Senior. Of the 41 for advancement, 33 were successful, while of the 10 initial nominations, 7 were elected Senior Members and 3 Members. Four of the 7 who were elected directly to Senior membership were former members of the Society who had been dropped for non-payment of dues. By this election the Council seems to have reversed the attitude it held last year, when one candidate for direct election to Senior membership was refusd admission to that grade and elected Member, apparently upon the principle that when men are dropped from the rolls for failure to pay dues, re-entrance to Senior membership must be through the grade of Member. It is obviously desirable that such inconsistency should be made impossible by suitable provision in the proposed by-laws.

Geographical Distribution of the Newly Elected Members

I have had no opportunity to bring up to date the geographical distribution of the total membership of the Society, which was contained, for 1924, in Mr. Bryant's report last year. The following table, however, shows the geographical distribution of the newly elected members, and will be of interest as indicating the increases available for the various Sections. The arrangement is purely by regions, however, and the number of accessions for any region named may or may not be entirely associated with the local Section.

VOTING MEMBERS* ELECTED FROM MAY 1 LIST

States	Number of Elections
Northeastern	32
Southeastern (So. of Pennsylvania)	14
Lake and Ohio Valley	34
Northern Rocky Mountain	16
Central Rocky Mountain	3
Southern Rocky Mountain	5
North Pacific	35
California	18
Ontario	3
British Columbia	4
Alaska	2
Total	166

*Members and Senior members.

E. H. Frothingham,
Member of Executive Council in Charge of Admission

COMMITTEE ON VOCATIONAL TRAINING

The sub-committee on Vocational Training in Forestry as printed in the December, 1925, number of the Journal should be modified to read as follows:

J. F. Dubuar, chairman, New York State Ranger School, Wanakena, N. Y.

H. E. French, Forest Service, Pueblo, Colo.

T. C. Spaulding, School of Forestry, University of Montana, Missoula, Mont.

In the sub-committee on Forest Research in Educational Institutions, D. S. Jeffers, Department of Forestry, Iowa State College, Ames, Iowa, should be substituted for J. W. Toumey, resigned.

S. T. Dana

COMMITTEE ON INTERNATIONAL RELATIONS IN FORESTRY

The activities of this committee during the first year of its existence have covered a rather wide field. Co-operation has perhaps been particularly close with the International Institute of Agriculture at Rome, which is trying to place its present work in the collection of international forest statistics on a more permanent and edequate basis. A plan outlining the need for a comprehensive project of this character, and indicating the specific items on which data should be secured, was submitted to the Institute through the American representative. Mr. Asher Hobson. The plan was also brought to the attention of various representatives of the lumber industry in this country, some of whom expressed a keen interest in that part of it dealing with lumber trade statistics. Ways and means of putting the proposed plans into effect will be discussed personally with Mr. Hobson during a visit by him to the United States the last of December or the first of January.

The International Institute of Agriculture has also been urged to include forests and forest products in the world census of agriculture to be undertaken by it in 1930. Dr. Leon M. Estabrook, who has charge of the development of detailed plans for the survey, has expressed himself as in favor of this action. The matter was discussed with him at length just before his departure for Europe, and he was furnished with a preliminary schedule of the items relating to forests

and forest products which the committee felt should be included in the census. There will be opportunity later for such revision of this as may seem desirable.

The chairman of the committee has been serving as the American representative of the World's Forestry Congress to be held at Rome in the spring of 1926. Suggestions as to topics which should be emphasized at the Congress have been made and apparently favorably received. Fourteen applications from residents of this country for membership in the Congress have so far been received by the committee and about a dozen others have gone direct to Rome. It is hoped that agreement on the objectives of the American delegation at the Congress may be reached at the annual meeting of the society.

Contact with the International Education Board has been maintained, but no definite projects have been submitted to it pending the results of a comprehensive survey of forest research in this country and Europe, plans for which are now being made. The survey is to be conducted by a special committee of the National Academy of Sciences and was made possible by a grant of $50,000 from the General Education Board. Correspondence has been entered into with Prof. Hesselman of the Swedish Forest Experiment Station, and with Prof. Jonson of the Swedish Forest School, with a view to arranging for visits by them to this country to assist in our studies of forest soils, tree form, and the use of statistical methods in forest work. Both men seem interested, and the suggestion received prominent notice in the Swedish press. The committee has also been in touch with two German foresters who desire to come to this country under the auspices of the International Education Board.

Provisional plans for a meeting of the International Union of Forest Experiment to be held in Sweden in 1926 have had to be abandoned because of the death of Professor Schotte, Director of the Swedish Forest Experiment Station. The committee hopes that the revival of the Union, the last meeting of which was in 1910, may be considered at the World's Forestry Congress, and that definite steps in that direction may be taken at the International Congress of Plant Sciences to be held at Ithaca, N. Y., in August, 1926. A more complete report regarding that meeting will be made by the member of this committee (Prof. Hosmer) who is acting as the official representative of the society in developing plans for the Forestry Section.

All in all, the committee feels that gratifying progress has been made in promoting forestry projects of international importance, and in establishing closer relations between foresters in the United States and other countries.

R. C. Bryant
R. S. Hosmer
R. S. Kellogg
W. H. Sparhawk
Raphael Zon
S. T. Dana, *Chairman*

REPORT ON INTERNATIONAL CONGRESS OF PLANT SCIENCES

As representative of the society on the committee of Section Secretaries of the International Congress of Plant Sciences, it is, I think, in order that I submit a report, which I shall be glad to have presented at the annual meeting of the society at Madison.

As will be recalled, the International Congress of Plant Sciences (which is also the fourth International Botanical Congress) is to be held at Ithaca, N. Y., August 16-23, 1926. The Congress consists of 13 sections, 12 of which represent the various branches of botany. At this Congress for the first time forestry is given a definite place in this group, the section on forestry being on an equal basis with all the others.

The purpose of the Congress is primarily the discussion of problems having to do with fundamental research and teaching. It is proposed to hold four half-day sessions, at which will be presented a limited number of papers by men noted for their accomplishments in some particular branch of the field of botany, or of forestry. The organization of the program for each section is in charge of a secretary, who will also be the secretary of the section during the Congress. Participation in the formal programs will be by invitation and so far as possible the effort is being made in all the sections to have a majority of the speakers notable men from other countries.

In addition to the formal program there will be time available in each section for round tables and other informal meetings, when matters pertinent to the field covered by that section can be presented and discussed. It is planned further that there be local excursions and a variety of opportunities for personal contact among those in attendance.

The organizing committee of the Congress consists of Prof. B. M. Duggar, chairman, Missouri Botanical Garden, St. Louis, Mo.; Prof. H. C. Cowles, secretary, University of Chicago, Chicago, Ill., and Prof. H. H. Whetzel, in charge of local arrangements, Cornell University, Ithaca, N. Y.

There have been a number of meetings of the Section Secretaries during the year. The plans are now well in hand regarding arrangements for the meeting. Invitations to the speakers have just been sent out and soon after Christmas it is expected that informational matter about the Congress will be widely distributed.

In selecting the list of speakers for the Forestry Section, the secretary has been in constant touch with the president of the Society of American Foresters, with members of the Society Committee on International Relations, with the Forest Service, and with other members of the society. It is proposed that the formal forestry addresses shall be limited in number to sixteen. The invitations have gone to representative foresters throughout the world. It is hoped that most of those first invited will accept. But in case these men do not accept, arrangements have been made to invite alternates.

While it can not be definitely stated at this time just who the speakers will be, there seems to be no question but that the Congress at Ithaca next August will be a meeting of very distinct importance to foresters the world over. It is especially urged that all American foresters who can possibly do so arrange to attend this Congress.

It is not felt to be good policy to have, in connection with the Congress at Ithaca formal meetings of the American Scientific Societies. But from the fact that all the Section Secretaries are representatives of such organizations, it follows that the Congress of Plant Sciences has the official backing of these organizations. It would therefore seem appropriate that the Executive Council of the Society of American Foresters should take such steps as may seem to it desirable to bring about the attendance at the International Congress of Plant Sciences of as many members of the society as possible.

It seems more than likely that it may be feasible to develop further at Ithaca in August certain features in connection with international forestry matters that are likely to be introduced at the International Forestry Congress that is to be held at Rome, Italy, in May, 1926.

In any event your representative bespeaks the interest of all American foresters in the International Congress of Plant Sciences and

extends on behalf of the committees of the Congress a most cordial invitation to attend the meetings at Ithaca in August, 1926.

RALPH S. HOSMER.

COMMITTEE ON HISTORY

During the year nothing very dramatic happened as regards the work of the committee. From the nature of its duties perhaps this is not to be expected, although from time to time it is hoped that the acquisition of items of particular merit can be reported. The purpose of the committee is to provide a definite agency that shall be on the lookout to secure and safeguard papers and other material of interest to foresters that have, or may have, historical value. While there is not much to report at this time, those concerned with this work feel that it is important that this committee be continued, so that there may be continuity in its efforts and that it may be ready to function as occasion offers.

Perhaps the most useful purpose that the present report can serve is to remind the members of the society that there is such a committee, and to repeat the request, made in earlier years, that anyone having material of historical importance regarding the development of any phase of forestry in the United States, get in touch with the chairman, or some other member of the committee, concerning its ultimate disposition. There is much material that should be safely preserved. The Committee on History stands ready to care for it.

RALPH S. HOSMER, *Chairman*

COMMITTEE ON FORESTRY CLASSIFICATION

During the past year arrangements were made whereby the forestry classification scheme submitted by the society's committee, consisting of A. B. Recknagel, J. M. Briscoe, and C. F. Korstian, has been incorporated, with minor changes, as a part of the Extension Handbook which is being published by the Extension Service of the U. S. Department of Agriculture. It is expected from the press within the near future.

Dr. Philip Flury has prepared a tentative classification scheme, based largely upon that in use at the Swiss Forest Research Institute. Dr. Flury has proposed that this be used as the starting point in developing an international forestry bibliography of forestry. Dr. Flury's

scheme and proposal have been received too recently to permit a careful translation and comparison of his scheme with that organized by the society's committee and published in the February, 1922, issue of the Journal of Forestry.

It is recommended that the negotiations be continued with Dr. Flury and it is further recommended that an effort be made to have the question of an international forestry bibliography considered at the International Congress of Plant Sciences meeting at Ithaca, N. Y., in August, 1926.

C. F. Korstian, *Chairman*

DIVISION OF BIOLOGY AND AGRICULTURE OF NATIONAL RESEARCH COUNCIL

My appointment as member of the Division of Biology and Agriculture of the National Research Council representing the Society of American Foresters was effective July 1, 1925. Since that date, there has been no meeting of the division. On invitation, I attended the meeting of April 26.

The Committee on Forestry, of which Mr. Zon is chairman, was continued for the current year without change in personnel. The recommendations for two research projects contained in its report of April 11, 1925, were referred to the Executive Committee, which in turn referred the matter to Messrs. L. R. Jones, Raphael Zon and B. M. Duggar, with power.

A plan of reorganization of this division is under consideration, the object being to reduce the number of members without destroying their representative character. It is contemplated that the Society of American Foresters will be grouped with the American Society of Agronomy and the American Society for Horticultural Science, each society to choose one elector, and these three electors to choose one representative of the entire group as members of the division.

R. C. Hall

COMMITTEE ON SECTIONS

A number of the sections of the Society are not functioning satisfactorily and this is particularly true of some of the western sections. Further growth of the parent society in influence and membership is largely dependent upon the activity of the individual sections. Since the welfare of the Society is so intimately tied up with the work of

the sections, the committee has deemed it best to devote its efforts to an analysis of what the sections are doing and to draw conclusions therefrom.

Membership

In a number of cases, no systematic effort is made to keep watch for desirable membership material. Frequently members drop out of the Society without any effort on the part of the Sections to secure a reconsideration of their intention to resign, or to persuade them to pay up their dues before the secretary of the parent society is forced to drop them from the rolls. Each section needs an *active* membership committee to regularly canvas the field for new members and to hold the members already on the rolls. Not enough attention is being given to the promotion of members to senior members, a very discouraging thing to the ambitious younger members. There is a decided lack of a sense of personal responsibility in interesting prospective members in the Society.

Meetings

Some of the sections follow the practice of outlining a series of meetings considerably in advance, and sending mimeographed copies of the program to every member of the section. This enables the out-of-town members to attend occasionally, and to make valuable discussions at the meetings far more likely. Scheduled meetings are then supplemented by special meetings when desirable speakers are unexpectedly available. Too often, meetings of a section are arranged with insufficient notice to enable even resident members to attend. Frequently non-resident members receive no meeting notices whatever from one year to another. Inter-sectional meetings and meetings for the field study of forest problems have been found to be stimulating and helpful. Closer co-operation between the sections and other forestry organizations seems desirable.

Section Officers

In general, insufficient care is taken to elect section officers who have the time and the inclination, as well as the ability, to carry on the work of a section in the proper manner. In some cases, sections are making little or no progress because their officers do not function properly. There isn't enough competition for these offices. Many times, the choice of officers is restricted to those who can be persuaded to take the jobs.

Leadership in Forestry Matters

Within the geographical jurisdiction of each section, there are important forestry problems in varying stages of solution. It is all too true that frequently the sections are not making any effort to encourage public interest and action on these problems.

Contributions to the Journal

There is a real need for the sections to encourage the writing of articles for the Journal of Forestry and other publications. Opportunities for valuable contributions to forestry literature are not infrequently lost because the men who can make them are not persuaded to write them. The sections have the necessary machinery to help in this matter.

Criticisms of the Parent Society

In each section there are members who disagree seriously with the existing policies and practices of the parent society. Insufficient effort is often made by the sections to give opportunity for full and free discussion of such disagreements. As a consequence, misunderstandings have grown up which retard the growth of both the sections and the parent Society.

Concluding Statement

The committee finds that the sections are not all functioning satisfactorily. Several reasons for this have been stated in this report but the committee feels that back of the entire situation is the lack of an adequate sense of personal responsibility for the welfare of the Society and the failure of the individual members to realize that a stronger Society can do much to help both forestry and the forester.

The majority of the committee believes that the adoption of the November, 1925, report and recommendations of the Executive Council will do much to strengthen the sections.

The committee proposes, with the approval of the president of the Society, to prepare a detailed report of its findings and to send copies of it to the sections.

H. O. Cook
Duncan Dunning
C. F. Korstian
Quincy Randles
R. H. Weidman
J. P. Wentling
A. J. Jaenicke, *Chairman*

COMMITTEE ON CHARLES LATHROP PACK PRIZE

Fourteen papers, most of them of a high degree of excellence, have been submitted for the $500 Charles Lathrop Pack prize. Each member of the committee read carefully all of the papers without knowing their authorship, or the conclusions of his fellow members on the committee. Each, therefore, reached his own decision wholly uninfluenced by the others. It is of interest, as an index of the subject uppermost in the minds of foresters, that twelve of the fourteen papers dealt with the general forestry situation in the United States; only two were contributions to the practice of forestry in the woods. As the best contribution to the advancement of forestry, the paper which would appear to have the largest influence in furthering forestry practice, the prize is awarded to: "The Public Relations of Forestry," which we find to be by John D. Guthrie.

BARRINGTON MOORE, *Chairman*

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